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ASTOUNDING STORIES

APRIL 20

THE EINSTEIN EXPRESS

by J. GEORGE FREDERICK

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J. GEORGE FREDERICK

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You have 9 million tiny tubes or filters in your kidneys, which are at work night and day cleaning out Acids and poisonous wastes and purifying your blood, which circulates through your kidneys 200 times an hour. So it's no wonder that poorly functioning Kidneys may be the real cause of feeling tired, run-down, nervous, Getting Up Nights, Rheumatic Pains and other troubles.

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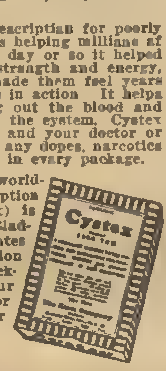

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Dr. W. R. GEORGE

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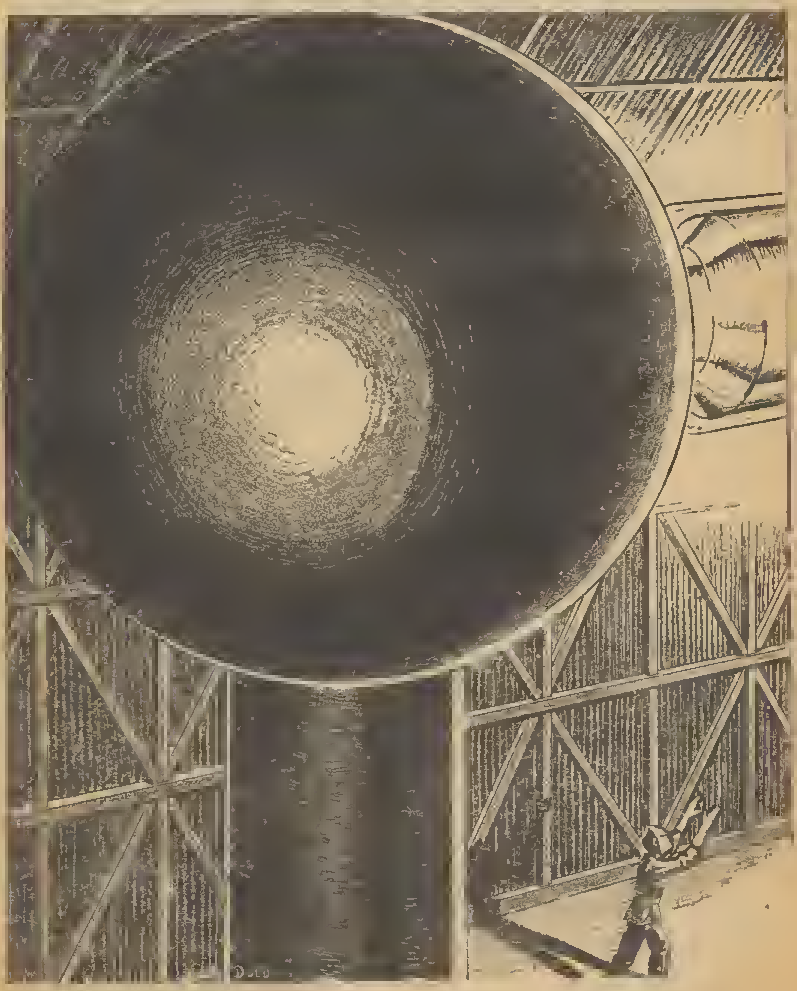
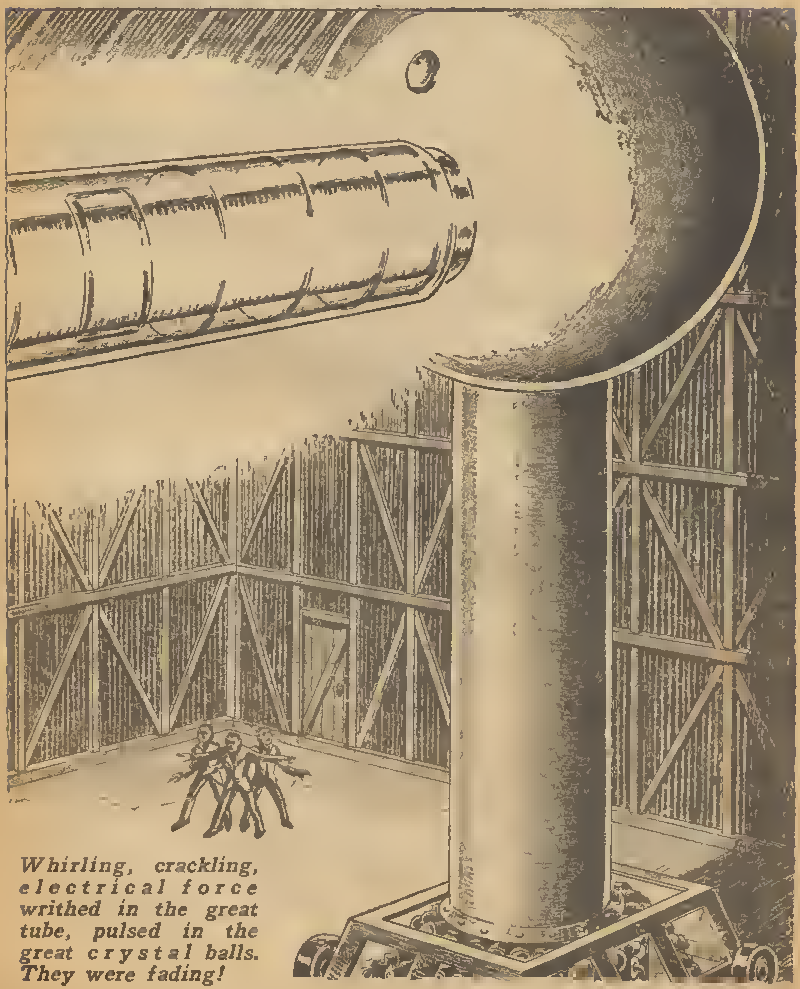


EXPRESS

by J. George Frederick

A Two Part Space Story

PART ONE



Whirling, crackling, electrical force writhed in the great tube, pulsed in the great crystal balls. They were fading!

"SIGN HERE," said the postman, and Arthur Woodlock, his eyeshade still over his eyes and a far-away look on his face, signed, mechanically, for the registered letter which had arrived at midnight at his laboratory where he was alone, as he had been for countless previous nights.

He was scarcely interested enough to open it, as he hastened back to his desk, upon which were piled many books and pamphlets and scattered sheets of paper. But there was a faint perfume about the envelope, and he knew it was from Amelia Carr, his fiancée.

"Dear old girl," he said, as he slashed open the envelope, "she's trying to get a rise out of me this time by making me sign for her letter. I've treated her shamefully, but, Heaven help me, I'm in the grip of something so appalling that I simply daren't think of anything personal right now. I'll make it up to her later."

Then he read:

"DEAR ART: This will probably not mean anything to you, but I want it definite. We cannot go on like this. Please consider our engagement broken. We live in a human world, and much as I have loved you, this business of being engaged to a young scientist married—absolutely fanatically married—to his work, is too much for me. I give up! Let science win. I mean it. Good-by.

"AMELIA."

Arthur's figure relaxed suddenly against the desk, and he drummed pensively on it with his finger tips for several minutes. There was a taut line to his lips. He had a peculiarly odd line to his head; his forehead came out from his eyebrows in a marked forward angle, and his nose was long and straight; his eyes a smoky gray.

"No," he said, as if in answer to something within himself. "No; she's right. Science must win, for a while, anyhow." He stared at the gaunt shadows on the wall, and then backward into the laboratory where a towering apparatus stood. "Maybe," he muttered—and his low, hard tones reverberated in a hollow sepulchral manner through the empty laboratory—"it will be for all time."

Then after a few minutes he sat down at his desk and penned to Amelia this note:

"MY DARLING: Yours was a serious letter, my dear, and mine must be equally serious. I realize now that it was an injustice to you ever to have made love to you. I loved you, and love you still, but the terrible thing is that when one has given his life to science and is struck by the lightning of important discovery, he is a doomed man so far as his personal life is concerned.

"Science in this year of 1942 is of more intense importance than ever—especially since I was so tremendously fortunate as to induce Winkler, the chewing-gum magnate, to back us to the extent of half a million for our experiment. A scientist in this position cannot choose—he must go on, if necessary against every instinct and emotion. You are right; science wins.

"I probably seem to you to be talking pompous nonsense, Amelia, and a year ago I would have laughed down any man who spouted such words. But you do not realize what has happened, my dear. It isn't an ordinary discovery which Gregory and I have made. Alas, not at all, at all! It is, in fact, something which I would not dare tell you.

"Gregory and I have not yet told more than one person—just one other scientist, our old teacher, Barton Peck—to make sure that we weren't stark crazy. A second is being told to-night in Chicago—Mitchell, the great physicist. We aren't even telling them the whole story, yet.

"I don't dare think about it myself; and only to-night the grisly realization came to me that quite possibly, in the course of events arising out of this dis-

covery, I might have to offer myself personally as a living sacrifice to science.

"If you think that such a statement reads like the raving of a disordered brain, Amelia, old dear, I would not at all blame you.

"You are well rid of me; I probably couldn't be anything but a heartache and a disappointment to any woman; perhaps a tragedy. I'm sure this will all be good news to Ackerman; perhaps you've already decided you love him better. He's a scientist, too, but in commercial work, and I've known for some time that he never gave up hope of you, even after we became engaged.

"But I do want you to know something in me is suffering bitterly; I do love you and always will. I writhe at the thought that Ackerman, whom I frankly don't like, should win you.

"Science may own my brain, but it has no power over my heart. I give you up very, very sorrowfully, and very earnestly wish you happiness

"ARTHUR"

Sealing and stamping the letter, Arthur put on his topcoat and hat and sauntered out to the nearest mail box. On his return he paused, gazing up into the clear October sky, full of stars. He stood, rigid and hushed as he looked into the richly clustered Milky Way. He raised his hand.

"Hail!" he shouted, on a sudden impulse. "Our backwoods days of isolation are over!"

A bluecoat moved out of the shadows and strode over. "Better get home to bed, sonny," he said kindly, but authoritatively; "you've had a few too many."

"Yes, officer," responded Arthur, with a sudden appreciative grin, as he quickened his pace toward his hard couch in the laboratory.

Early the next morning, he was awakened by the telephone, out of a troubled sleep—punctured with duels with Ackerman. It was Gregory Slocum, his partner in his discovery, speaking from Chicago.

"Get this," came in staccato, tense bursts of words over the phone. "I've been up all night with Peck and Mitchell. A stiff fight—I'm exhausted; but Mitchell asked to be left alone for a few hours—admits we absolutely dazed him—that's a laugh, eh, Art?—and now he just phones that he'll take a plane back with me for a complete demonstration with the dingus up at Springfield. We'll get to Springfield to-night, sundown. You be there. Don't forget anything. Mitchell's so excited he couldn't bear to delay even for a train. Get there ahead of us and see to everything—and watch carefully as the devil against any publicity leak."

II.

IN FORTY minutes Arthur Woodlock had packed a bag and made his way to Grand Central Station to take an early train to Springfield, eating breakfast on the train.

A taxi from the station at Springfield took him to a dilapidated old airplane hangar on the far edge of a remodeled landing field. He found Terry, the heavy-jowled old Irish watchman, dozing in his armchair, a sandwich in his hand. Arthur kicked the rungs of Terry's chair.

"Wake up!" he called, and the sandwich dropped from the startled Terry's fingers. "Get your ladders and start polishing up Big Bertha's two heads," ordered Arthur briskly, as he shed his clothes and pulled on his denim work clothes. "Snap into it!" he called, as Terry still doddered rheumatically.

Going to the crude desk in a corner, on which was a telephone, Arthur began the calls for special electric service which was required for the operation of the gigantic device which almost filled the old hangar. "Big Bertha" these few intimates called it who knew about it, because it was the most powerful and

advanced piece of "atomic artillery"—for bombarding atoms—so far constructed.

A slightly similar device had been set up years before by M. I. T. experimenters at Round Hill, but with this one, new and strange experiments had been carried on in secret by Woodlock and Slocum, with the sympathetic aid occasionally of their old professor, Barton Peck, who was also arriving from Chicago with the great Mitchell, world-famous scientist

Arthur looked out at the two huge cylindrical pillars, or insulating columns, six feet in diameter, fastened on a heavy steel base mounted on wheels, each cylinder topped at a height of thirty feet by a great, hollow, polished aluminum sphere, fully twenty feet in diameter. Between the two great spheres was suspended in air horizontally a great glass vacuum tube

Terry was already swinging on a rope ladder polishing the glistening surfaces of Big Bertha's two shining spheres. Soon there arrived mechanics who went to work tuning up the machinery in the steel bases of these two separate mushroomlike structures.

Arthur himself studied the textolite, of which the two upright cylinders were made—hundreds of layers of paper 17/1000ths of an inch thick, glued together with shellac under high pressure. Also the endless belt system within them by means of which electrical charges were sprayed on the chain units at a 20,000-volt pressure He climbed up the narrow aluminum ladder inside until he was within the huge sphere at the top and sat in one of the metal chairs.

In this sphere, he might become charged with eight million volts of electricity and still not know it. He watched the endless chain units bring up, each of them, a minute electrical charge, which was caught on the brushes and stored in the sphere as "potential." It looked for all the world like the old chain bucket pump on Woodlock's father's farm during his boyhood

Inside each of the great spheres—elaborately fitted with instruments—Gregory Slocum and Arthur Woodlock had stayed sometimes for forty-eight hours at a time—Slocum in one, Woodlock in the other—positive and negative; the outside world forgotten, as well as all mundane things, including Amelia. Gregory, a confirmed bachelor, had no near relatives. Terry sometimes had trouble urging sandwiches on them, his simple Irish heart alarmed at such inhuman devotion to science.

"I'll stop the motors if ye don't eat, lads," he had called up once. That did produce a result.

In the late afternoon, the whir of an unfamiliar plane indicated to Arthur that Gregory and the two scientists had arrived. The landing-field attendants were annoyed at the abrupt manner in which the passengers left the plane and strode rapidly to the old hangar.

Mitchell gave one keen look at the two giant generators as he entered the hangar.

Van de Graaf principle," he said succinctly.

"Yes, but——" Gregory replied, and was about to launch upon a further explanation, but Mitchell waved him off and advanced upon the generator.

"I suggest," whispered Professor Peck to Gregory, as they dropped to the rear, "that we let Mitchell go about everything in precisely his own way."

Arthur Woodlock, with insulated clothing, met the party twenty-five feet from the foot of the positive generator —raising his hand to indicate a safety dead line; the hum of the motors and a certain peculiar crackling sound being audible.

Mitchell wasted few words on social amenities. There was probably in his mind the idea that if the things which had been told him should prove to be a myth, he might still catch a night plane

home, for he was deep in his own special work, in addition to preparations for an international scientific congress, at which he was to preside.

"How much potential have you?" he asked

"We have just read 7,000,000 volts," replied Gregory. "By seven o'clock, we shall have our maximum, about 8,250,000."

"Let me check that," said Mitchell; "also your safety arrangements."

Gregory recited them to him and pointed them out.

"If you will put on the special insulated shoes and work clothes we have ready for you, you can come nearer and climb up into the sphere," said Arthur Woodlock respectfully. "Our triple lead barricades there protect from the X rays"

Mitchell did so quickly and then came to the base of the positive generator.

"Yes; I see," he said, his quick eye taking in many things at once.

Neither Woodlock nor Slocum ventured technical explanations. They would obviously have been wasted on this master physicist, at least at this preliminary stage.

"I'm ready to ascend now," he said, after two minutes of looking at the base machinery.

WOODLOCK led the way—he was the one most familiar with the positive sphere. The great cylinder, towering fifty feet or more with its huge spherical head, rocked slightly as the men ascended; but once up in the sphere room, artificially lighted, the effect was like a strange, modern house of some future period of civilization—the walls and ceiling entirely spherical; the floor a brilliant red composition, on which the inch-thick crape-rubber-soled special shoes of the men trod with the soft pur of cat's-paws.

Mitchell looked about with catlike quickness of interest, a look of recognition coming into his eyes at noting each of the many instruments, at the special lead barricade. He lost some of his abruptness; he recognized himself as being in the company of those who could speak his language, and not, as he had possibly still feared, up to his arrival, a group of overoptimistic amateurs. He relaxed into an expansive mood.

"Of course, every one knew when Mory in 1936 smashed through the ring of outer electrons, on through the inner potential barrier to the nucleus, that we were on the threshold of very startling things, Woodlock," he said, as he seated himself in one of the peculiar aluminum armchairs in the sphere. "But there have been many unexpected problems, as you know, and we have had no Dr. Dirac to predict just what we would discover, in the manner that he predicted the existence of the positron years before it was found.

"Our theories broke down, as you are aware, when we found that the forces between electrically charged particles close to the nucleus do not obey the Coulomb law of force. How to get over the hurdles which the Heisenburg, Dirac, and Oppenheimer-Furry theories set up was certainly a job for the best of us. And then the astounding revelations in 1938 when the new two hundred-inch telescope was set up in California. How's your potential getting along?"

Both peered at a dial on the instrument board.

"It's 7,640,000 now," responded Woodlock, his younger eyes more quickly reading the dial. "In another half hour——"

"Splendid!" beamed Mitchell. "It's a magnificent technical feat. About 6,000,000 volts, wasn't it, that the last generator built at Round Hill in 1939 accomplished?"

"Yes," replied Woodlock. "Our new brush system is responsible for the increase. Credit Gregory for that."

"Fine fellow," responded Mitchell

warmly. "I had confidence in him at once when Peck introduced me."

"Thank you," murmured Woodlock.

"Well, when you throw your switch in half an hour," mused Mitchell, as if talking to himself, "the combined electrical pressure from your positive and negative terminals will be over 16,000,000 volts. Exciting! Never been done before! Are you sure of your vacuum tube? It's a beauty—a triumph of man over the lightning; must be about fifty feet long and nearly six feet in diameter, isn't it?"

"Fifty-one three sixteenths," replied Woodlock. "May I suggest that you put some wadding in your ears?"

"Yes, yes," said Mitchell absent-mindedly. "A great electrical Niagara; that's what we have here. Imagine! My body is charged with nearly 8,000,000 volts, and I am delightfully comfortable."

"The sphere is air-conditioned," commented Woodlock, a little absently, keeping his eye on the dial. He seemed also a little nervous.

"Professor Mitchell," he said, turning suddenly, and with a peculiar solemnity, "we have not told you all."

"No?" responded the scientist inattentively, as he gazed at some instruments.

At this moment, Professor Peck came up the ladder and silently seated himself.

"I have just said to Professor Mitchell," repeated Woodlock, "that we have not told you all. Gregory and Peck told you only of the fact that we had been bombarding various targets in our vacuum tube and producing new types of synthetic atoms and X rays more powerful than anything known, even radium. This, as you know, has been expected; this was enough to interest you to come East What we did not tell you, Professor Mitchell, nor Professor Peck, was that the experiments have proceeded much, much further than this."

Woodlock paused, and there was silence. Woodlock fussed with the handles of some of the instruments, as if under a strain.

"Yes, yes, go on," encouraged Mitchell.

III.

"IN FACT, professor," continued Woodlock, speaking with noticeable difficulty, "I ask you to bear with your ideas of our sanity when I tell you that in the past ten days new things have happened with an utterly appalling rush. We have hardly slept. We have not even had time to take Professor Peck fully into our confidence. We wanted you both here. May I add that Gregory, who is over in the negative sphere is listening to this conversation by means of a short-wave radio set. Any question you may ask of him he will answer instantly. Are you there, Greg?"

"Sure!" boomed the answer, with a peculiar metallic ring to his voice caused by the spherical metal room.

"Professor Mitchell and Professor Peck," proceeded Woodlock, measuring his words; "in the next two hours you shall see matter disintegrated and transformed into light; and then at will, by means of a key matrix, reintegrated into its original form, independent of time. This we can do even with a living organism" Woodlock's voice had risen to an odd pitch.

Professors Mitchell and Peck looked at each other, plainly distressed.

"Won't you first of all go on with your bombardment of atom targets and let us study the effects on various specific atoms?" said Professor Peck very gently and conciliatorily. "We can discuss your further ideas afterward"

"Certainly," replied Woodlock, with elaborate courtesy and a little wry smile.

"Potential 8,000,000 volts here, Greg," he called in a short while.

"Check; same here," boomed Gregory's voice from the negative sphere.

Woodlock threw a switch; the generator motors died down.

"Greg, you heard what Professor Peck said. We'll begin with our old stuff. Lock out section two in the tube. Now let's shift targets. Slip in No. 17, will you?" In an aside to the professors he said: "That's the neon target."

The scientists nodded.

"O. K." called Gregory, and, a minute later, "all set!"

"Ready!" called Woodlock, taking a competent appraising look about. "Your ear wadding, Professor Peck, and your chair a little more toward the center of the room, if you please."

He turned out the lights, plunging the room into absolute darkness.

A second later Woodlock threw a large switch. Instantly the fury of a thousand submerged and harnessed hells seemed to break loose. The giant vacuum tube, as all could hear, and all see—through the tiny glass porthole sighting along the vacuum tube—was a blazing furnace of strangely turbulent light, rapidly oscillating from one color of the rainbow to another. The noise was thunderous.

For ten minutes all sat silent. Then Arthur Woodlock pulled the switch, turned on the lights.

"All well, Greg?" he called to Slocum.

"O. K." came the response. "I'll bring over the target remains."

Anxiously, eagerly, the scientists studied, microscopically, electrically, mathematically, the target results, after Gregory came up the ladder with them. Professor Peck handed Mitchell a memorandum of figures and a diagram. Mitchell wiped his glasses, studied it intently. Suddenly he laughed like a boy, one could see why his students had always loved him. He had the authentic glee, the ardent curiosity, of the small boy in fresh discovery.

"Young Mr. Jove, my immense congratulations!" he said, extending his hand with a great smile, his vast shock of iron-gray hair standing upright like a great pompadour on his head, as a result of the powerful electrical forces which had played about. "Your fame is secure—absolutely secure. You are a creator of new matter. But go on, go on! I shall not leave this place until we have exhausted all your repertoire. This is a great moment in my life, too."

WOODLOCK, without replying, called down the cylinder to Terry: "Everything O. K.?" Then, on receiving Terry's cheerful Irish grunt, he started the generators anew to bring the dials up again to full maximum potential.

For the next four hours, as the night wore on, he placed before the scientists target after target, showing the amazing effects upon various atoms of the most unheard-of bombardment of 16,000,000 volts. Their interest was so great that they lost the sense of time. Woodlock had Terry bring up sandwiches and coffee at several intervals.

But suddenly he paused after the twelfth target had been examined. Speaking quite firmly, he said: "Gentlemen, with your kind permission I insist now that you give very special attention to my next target—a dog. I want you to go to the negative sphere, where Gregory is, which is also nearest the target part of the vacuum tube. There is a peephole there and I want you to watch that target. You will need to wear special leaden protectors and glasses. Gregory will take care of you."

His tone had a certain finality in it. The scientists good-naturedly acquiesced, and as soon as they were gone from his positive sphere, he made busy with many changes of switchings on the instrument board and other technical details. Meanwhile, over in the negative sphere, Gregory was inserting a large four-by-four-foot plate of shining metal into a

slide pocket just behind the target in the vacuum tube. It fitted precisely like the old type of dry plate on large cameras.

Down on the ground floor, Terry was carrying in his arms a mongrel dog, his feet tied, toward the ladder leading to the negative sphere. Quite silently, the two scientists watched Terry and Gregory place the dog into the target space in the great vacuum tube, by the operation of a series of great glass doors and compartments, like the separated bulkheads of a ship. Finally, all could see the dog lying in the huge tube, his lines blurred somewhat by the semi-opaque glass, but his head plainly moving.

"Now, gentlemen," came Woodlock's voice over the short-wave radio from the opposite sphere, "I will make no argument about this experiment. I have already told you we will transform mass energy into light, even though that mass be living organism. Are you ready, Greg?"

"O. K.," came Gregory's usual colorless response.

Once more for ten minutes the rumble of man's thunder, and the hissing roar of man's chained lightning in the tube. Then silence.

"Greg," came Woodlock's voice; "let the professors look to see if the dog is there, and then show them the key matrix."

Out of the peephole the professors looked. The dog was gone.

"Hum!" was all Mitchell said.

Gingerly Gregory lifted out the key matrix. The metal plate was hot. With asbestos gloves, however, he brought the sheet out and laid it on a specially prepared table. The scientists studied it gravely. It was peppered with a hieroglyphic design.

"You are seeing," came Arthur Woodlock's voice, "the only thing left of the dog on earth. It is the pattern of his atomic composition, the exact inventory—together with the spectrum record—of the matter of which he was composed. 'Dog Star,' we call him—the greatest traveler who ever inhabited this earth, if you'll permit me to say so. The light into which we have just transformed him is now somewhere out near the moon. But good old Dog Star has traveled a lot farther than that, because this is the tenth journey into space that he has made, and we have always brought him back by means of this key matrix. We'll do it again for you in a few minutes."

Professors Mitchell and Peck looked at each other. They said nothing; but around their eyes slowly gathered a most distinctly dazed look.

"Watch now for Dog Star's return," was Woodlock's next statement; "get ready, Greg."

Gregory lifted the key matrix, now cool, and inserted it into place in the giant water-cooled tube.

Again the rumbling, the sputter, and the impact upon the tympanums of the scientists, as 16,000,000 volts beckoned Dog Star back out of the great sky of stars overhead. The reassembly was a process of half an hour; it has always in life taken longer to build than to tear down. Silence.

Mitchell looked out at the peephole. He did not need to. Dog Star's muffled yelps could be heard, and Gregory was ready, poised with asbestos gloves at the instant of the turn of the switch to open the doors and release the bewildered reborn mongrel from the intense heat, which in a few minutes more might have killed him. He brought Dog Star into the negative-sphere room. Woodlock was behind him, coming over from his post in the positive sphere.

He was in time to see Mitchell and Peck stand as though turned into marble pillars for a few minutes. They gazed at Dog Star with almost a horrible fascination.

IV.

"AND ALL THIS was done in the same tube, with the same voltage, as the other simple atom bombardments?" suddenly snapped Professor Mitchell, as though his intelligence had now once more begun to function, and using the same burning sarcasm and ironic incredulity which his students had long learned to dread, and with which he lashed them on to think through enormously difficult problems

"No!" cut back Arthur Woodlock, this time with cold incisiveness containing no more reverent deference; "we are not boys in a play laboratory, gentlemen. We are stating flat truth to you; take it or leave it. We have two compartments in the tube, and we have adopted the principle of the Armstrong feed-back circuit to our giant tube.

"What you have just seen was a special step-up process, and we actually attained a combined electrical pressure of 32,000,000 volts, and can go higher, if any one can build a tube to hold it. I would have told you all this in advance, but for a rather excess amount of scientific skepticism on your part." Woodlock's words crisped like the sound of his high-voltage tube in action.

"Keep your shirt on, young man," replied Mitchell amiably, but rather solemnly. "I will admit I am shaken to the core."

He paused to wipe his forehead with the large blue silk handkerchief, which was famous in his classrooms. He walked the complete circuit of the room; then wheeled about.

"Why, gentlemen," he gasped, "if you can actually do this——"

He stopped, his eyes fixed in a glaze of contemplation for almost a petrified moment; more beads of perspiration breaking out visibly on his forehead

"It means virtually the power to create; it means that human beings may be shot out into space in the form of light and reassembled, without having aged, a hundred thousand years later. It means a kind of immortality; it means interplanetary travel!"

Professor Mitchell began again to walk about, this time like a madman. "It means triumph over time, over matter. It is an Einstein express to eternity!"

Professor Peck looked on, his hands twitching as if he was an epileptic.

Suddenly Professor Mitchell stopped in his tracks. "Don't let's talk any more nonsense," he said briskly, in an ordinary tone. "Repeat your performance, and let me check every inch of the way."

Woodlock's eyes gleamed. That was the talk he wanted to hear. He barked out some orders to Terry, down the cylinder, as he descended and made for his post in the positive sphere. "Gregory will give you gentlemen every opportunity to observe every step. But I beg you to be extremely cautious with your protectors and lead guards. I need not tell you the great penetrative power of these rays."

Twice within the next few hours Dog Star was sent into eternity, and twice recalled; and the poor animal was inert and exhausted at the end of the second time—as well he might be! Woodlock called down to Terry to give the dog an extra steak bone.

Professor Mitchell was a demon of attentiveness to every detail; once Gregory had to snatch him back peremptorily when he incautiously exposed himself to ray action

Terry was sent out to find a dead dog. He came back with a terrier asphyxiated that day by the S. P. C. A. It was thereupon proved that dead organisms could not be reassembled alive Woodlock had himself made that experiment weeks before.

At the close of all this activity, the great scientist was limp and wilted. After all, he was sixty-seven. But his eyes were like fiery coals with mental

intensity, after the night-long session. It was already nine a. m.

"I suggest that you come over to the club, have breakfast and a little round of sleep," said Woodlock.

"No," replied Mitchell very calmly; "we will go there and have breakfast, yes; but sleep? It is impossible. I am going to wire Professor Einstein to join us by plane. Also, with your kind permission, several other gentlemen. This is a very grave moment in human life on this planet."

"You are right," replied Arthur, quite thankfully; "I have a vast sense of relief that you consent to share the responsibility which has been almost crushing Gregory and myself. We thought you and Dr. Peck should jointly share it with us."

They said nothing to each other in the taxi, and ate their breakfasts at the club in a strange kind of silence.

FOR TWO DAYS thereafter, behind barred and watched doors, six great scientists were in session, each sworn to utter secrecy. Professor Einstein was ill, being by this time rather an aged man, and Frau Einstein would not permit him to be disturbed. Both Woodlock and Slocum were obliged, over and over again, to present their formulas, their experimental records, and to make detailed calculations and representations.

Discussion and critical analysis was constant, endless The six scientists, who had left important work, kept wiring home, postponing their return. This caused curiosity, inquiry, and on the fourth day the newspapers, with their foxlike ability to scent, got on the trail. There flew rumors about; the harassed scientists made equivocal answers, the old airdrome was found, and a news photographer nearly lost his life by breaking into it at the moment when the high potential voltage was in action. Terry saved his life—but the man's hands and face were discolored for life.

With the help of interviews with other curious scientists, who knew of atom-bombardment experiments going on, guesses were made and printed by newspapers, which the scientists finally agreed were more harmful than if part of the truth was told, in guarded form.

They issued a harmless statement about "experiments in atom disintegration and reassembly which promise in time some important step in man's mastery over matter." They camouflaged the truth by elaborate descriptions of some of Woodlock's and Gregory's minor experiments and permitted the reporters to climb up into the sphere rooms and photograph the generators to their hearts' content.

But the serious scientific writers, themselves very deeply informed, could not be put off. They knew that something more was in the wind, and their technical questions were very difficult to parry. It was decided at last to let three of them into the secret.

The inevitable result was that fellow scientists insisted on more information; and then there was even more violent critical comment from the scientific world. Cablegrams from great scientists the world over arrived. There was fear that reputable scientists were indulging in silly speculative statements.

The thing was impossible to hold, and one day the newspapers got the real story, somehow, garbled as it might be. "Man Resolved Into Atoms and Reassembled." "Science Triumphs Over Time." "Animals and Human Beings Transformed Into Light-waves." "Man Conquers Space and Time at Last." "Man Can Now Travel to the Stars."

These were some of the lurid headlines which were published. Meantime, the scientific world began to scoff still more; there had been disbelievers even among the inner council.

Life became very difficult for Arthur

Dog Star was back again, panting and weak, but safe. If only he could tell!

Woodlock and Gregory Slocum. All kinds of offers, crank letters, and newspaper and magazine writers poured in upon them. Cranks were eager to be transformed into light-waves, some even offering pay. Hysterical religious zealots insisted that they were selected by God to be the first to travel to the stars. There were other letters threatening their lives. At last, from sheer self-protection, Woodlock and Gregory arranged secretly for a bungalow in the Berkshire Hills, isolated, but within several hours from their apparatus.

The day before packing his laboratory and personal belongings, Amelia suddenly stood in Woodlock's doorway.

Arthur was about to say something, when she rushed up to him.

"Don't say a thing, Art, until I've spoken!" she said, quite visibly agitated. "I've been making a dreadful mistake. I love you and, like many women, I was jealous of your terrific devotion to your work. I twisted it into lack of love for me. I see now how small I was. Please, *please* forgive me!"

Arthur looked at her gravely without speaking. She began to tremble violently, fearing to hear from him her own previous words of renunciation.

"Amelia," he said, "no doubt you've been reading about these strange things Gregory and I have been up to. You know, perhaps, about our ability to reduce a human being to atoms, light-waves, and send him out into space toward the stars?"

Amelia nodded.

"Well, one of these days shortly," Arthur said, his words coming a little hard, for he had told no soul of his decision, "one of these days soon I'm going to be the person to be reduced to atoms and travel out into space. I've made up my mind; keep the secret close, my dear. But I must tell you, so we cannot misunderstand each other. I love you—but I've got to forget everything and go!" There was an almost fanatical note in his voice.

Amelia burst into tears.

"But you'll come back soon, Art, won't you?" she cried, grasping his arm.

Arthur looked at her with level eyes, pressing her hands to his breast.

"Amelia," he said strangely, a tensity about his body, "how can I know what will happen? I'm going to travel to the stars, Amelia, think of it."

"Oh, Art, take me along!" she wailed, clinging to him; "Take me along!"

V.

A SERIOUS situation now arose among the scientific groups which were delving into the new disclosures of Woodlock and Slocum. There was a group of five or six scientists who took the view that the assertions of the two men as to their ability to disintegrate atomically and then reintegrate living organisms had not, in fact, been amply enough proved. Nor, said they, were the calculations and theories by which the feat was explained and executed free from certain blank spaces and speculative assumptions.

Furthermore, they were profoundly shocked and even panic-stricken. These men proposed, as a measure of wisdom and safety, that there should be no further attention paid to the disintegration of living organisms, but that all attention should be concentrated on the atom study which every one agreed had been greatly advanced by Woodlock and Slocum.

These objectors made the point that further experimentation with living organisms would now almost certainly run foul of the law and the animal-protection societies. They were quite frank to admit that even if the Woodlock-Slocum experiments could be believed, they were so extremely dangerous that they were certain to lead to incredible complications, possibly grave

disaster—even though great benefits were also possible.

"Suppose," said Professor Tenner, one of the scientists present in the conference—directing his question to Woodlock—"that we would be foolish enough to place Professor Einstein in your vacuum tube and disintegrate him and retain the key matrix of his composition. What is to prevent you from re-creating, not one but a dozen reintegrations of Einstein?

"In fact, will you tell me why we couldn't make a million Einsteins just as well as a dozen? Wonderful, of course! But by the same token, tell me what, if some Machiavellian monster owning an apparatus like yours should decide to make a key matrix of a man who is the Dillinger or the Jukes of to-day and make a million duplicates of such a criminal, what would become of the world?

"It is incredibly monstrous, this device of yours, if it is actually able to do what you say. It will be seized by governments or dictators, and civilization will crumble overnight in a frightful shambles. I will not yet admit that you have such an apparatus, despite the seemingly formidable evidence you present here. But assuming that you have, we may find it crucial to suppress it; or at least to declare a moratorium on its further development."

"Only to have some one else who seeks power take it up and perhaps use it secretly," hotly replied Gregory Slocum. "Then we *would* have world pandemonium!"

"Just to introduce a lighter side," remarked a scientist present, "perhaps it will mollify Professor Tenner if we look at the constructive feature of the thing. If we found the most perfect, the most beautiful woman in the world, and made a key matrix of her, then we could duplicate her and deliver one to each man present, with the compliments of Messrs. Woodlock and Slocum."

There was a constrained laugh at this.

"Do not let us jest too much at this matter," returned Professor Tenner; "the implications of this thing, if it is true, are far more astounding, more terrifying, than we may realize. On the constructive side, the possibilities are admittedly great. If we can reproduce living organisms, we can produce, without much effort, the meat supply of the world, and, in fact, a good deal of the raw materials of the world. Farming, mining, and some manufacturing would be rendered unnecessary.

"But what grave dislocations even this would cause! True, you are not yet able to create gold or precious stones with it, but it may become possible. The prospects of this discovery are more utterly appalling than our imaginations are perhaps capable of. I spent the evening yesterday with Professor Einstein, who, you know, is now confined to his room and must carefully conserve his strength. We sat up as late as he dared, and together we unrolled before our eyes some of the logical implications of the discovery—if it is such.

"I will confess to you, gentlemen, that I was impelled to place my hands before my eyes in horror. I am not authorized to speak for Professor Einstein, but I speak for myself. I have firmly made up my mind about it. I here and now solemnly propose that the details of this discovery—if they are fully verified by several months of further checking—be sealed up in a leaden casket and that the United States government be asked to build a heavy granite tomb for it at Arlington, to be guarded by soldiers day and night, and the tomb never to be opened. If a future generation cares to take the responsibility of robbing this tomb, let the burden be theirs."

MURMURS ran through the room.

"Tell us what Dr. Einstein said," was the comment on various sides.

"I may not and I will not," firmly

rejoined Professor Tenner. "Dr Einstein has set a policy of refusing absolutely to discuss further this new development."

"We must honor his wishes," replied Professor Edgecomb, another leading scientist. "Personally, however, I have no difficulty in visualizing to the full the horror side of this discovery. In the hands of monsters of cupidity or unrestrained commercial or political or abnormal creatures, I admit such a discovery might quickly wreck civilization.

"But do not forget that most great scientific advances were resisted because it was feared that all good things would be wrecked. Copernican astronomy is an easy case in point. This new Woodlock-Slocum principle might gradually be used to benefit the world vastly, even by the dubious process of making duplicates of desirable people.

"What would we not give for a key matrix of Shakespeare! To be able to make duplicates of him, as you cut biscuits with a cooky-cutter—what an appalling, but also fascinating thought! But my own proposal is that, after this discovery is amply verified, we set up a Key Matrix Commission, composed of seven great scientists and eight general leaders of thought, who would decide by a two thirds vote precisely what to do or not to do with this discovery, keeping its formulas secret, and by law prohibiting any one from using that type of apparatus; which fortunately can be built only after much time and a huge expenditure of money."

Finally this latter plan prevailed, and then a secondary period of test of the discovery began For three more weeks Woodlock and Slocum were obliged to go over, with agonizing and painstaking care, all the processes, calculations, and auxiliary experiments; also new means of checking the actuality of the reintegration process.

There were still among the scientists those who worried lest a kind of magician's trick was being played upon them; lest perhaps Dog Star merely was concealed from view instead of being sent to travel into the far spaces.

When these tests were over and skeptics fully satisfied, Woodlock and Slocum went to their bungalow for a rest. But within a few hours Woodlock was up. He paced about, smoking furiously for several hours. When Slocum stirred on his couch, Woodlock called him.

"Greg," he bellowed, "come here! I've got to talk to you The big decision now faces us."

VI.

STILL a bit sleepy, Gregory Slocum obeyed. He slumped into a deep chair.

"I feel it in my bones, Greg," said Woodlock, "that I'll have to act quickly, or we'll never get our big idea across Those fellows are obsessed by two ideas, and two only. They are college professors, most of them, and innately conservative.

"Greg, I think that in another ten days they will succeed in putting restrictions around us, and we'll be prohibited from operating Big Bertha except under rigid, stupid supervision. Their minds run first to its possible commercial use—to duplicate steers, cows, and chickens, probably, and set up a meat industry." Woodlock spoke with fine scorn. "I never even thought of *that* as a use for our great discovery!

"But the next thing they think of is far more discouraging and dangerous. They want to abolish it or severely limit it. That, Greg, would make all our work a mess. None of them, except Mitchell, seem to be thinking about interplanetary travel on waves of light; but, Greg, you know that's what I'm really interested in."

"I don't think they see how it can be done," replied Greg slowly, rubbing the

sleep out of his eyes. "As a matter of fact, Art neither do I. When a man is reduced to X rays traveling at the speed of light—well, what is he? He's just an X ray of light, and as such what good does interplanetary travel do him? He has no consciousness; he's just ionized matter, or a wave pattern in space, and no longer a man. I know I've had this out with you before, and you have an answer, but I'll be damned if I quite get it."

"All right, Greg; I'll admit to you that I haven't any complete dope on the thing, but I have theories. Greg, the fundamental units of nature, we now know, as, first, the *neutron*, with no electric charge, second, the *positron*, with a positive charge, and third the *electron*, with a negative charge. That's the stuff the universe is made of. These three units are complete in themselves and pregnant with everything else in the world, including mind.

"Listen to me, Greg. I've got a very tall idea. Don't get scared. I have a hunch—I know you'll think it wild—that these three fundamental units of nature are personified in human beings. We are merely such units made more complex.

"Remember Eddington's statement that the human body may be regarded as a device by which an atom is magnified in its nature and effects up to a visible scale? If three human beings, representing these three units of nature, should be disintegrated into light-waves in our Big Bertha, all at one time, I have a belief that we will have put into space an atomic grouping of particles which have a kind of consciousness."

"Yeah?" commented Greg, with a slant to his eyes, denoting the idea that Woodlock was raving.

"Yes; I do," continued Woodlock, vibrating with intense interest. "Then, if I am right, our interplanetary travel will have some meaning and some result. But let us say that I am wrong. Still, when we are reintegrated and brought back to earth, there would at least be a chance that some vague memory or intuition of what had happened might creep through consciousness. Even if not, Greg, how can we let these mandarins of science stop us from the mighty adventure of sending a human being out into space, like we did Dog Star?"

"Hey," commented Greg, "step carefully. We have discussed this before. You know quite well we could be put in jail, or hanged, or mulcted for damages if we did to a human being what we did to Dog Star."

"But what if you and I and Amelia, all at once, were to be shot into space?" Woodlock thrust out the words with the snap of a pistol shot.

SLOCUM became really wide-awake at this. "You and me and Amelia?" he repeated. "Now I *know* you're cuckoo! I suspected you were working up to deciding to go yourself, but not *three* of us! Great Jehoshaphat! What's the idea?"

"Well," Woodlock smiled, "I told you that those three fundamental units of nature belonged together. We'll say that I'm the *positron*, Amelia the *electron*, and——"

"And me the *neutron*, eh?" Gregory chuckled. "What makes you so positive that you're the positive and I'm the neutral?"

"Just observation," replied Woodlock, grinning. "You get me, now, do you? The man in a sex pair is positive; the woman negative. A *positron* is a union of negative and positive. You, unpaired, and with a generally negative temperament, I am sure would register neutral. You would be the *neutron*."

Gregory scratched his head, his face a little twisted with a sense of confusion. "I can think of a dozen reasons why

this is all cuckoo," he said at last. "First of all——"

"I know all of them," snapped Woodlock. "You're thinking that we can't get away together, because one of us is needed at the apparatus. Answer: We'll work up an automatic stop for the generators, and Terry can help. We'll instruct him carefully and leave a sealed letter for Professor Peck, who will take care of the precious key matrix of us all. And as for Amelia, she's already been begging to go with me. Yes, Greg; I've got the answers, but I'll admit frankly that there are a lot of questions I would like to be able to answer, but can't."

"Such as?"

"Well, I'm thinking of interplanetary travel, but is there such a thing really possible on my thesis? Our light-rays will be shot out radically, of course, to all points of the compass simultaneously. We cannot select a path to travel—and shouldn't if we could, for our aim couldn't be true. We are, therefore, diffused into space, and perhaps lost.

"But that's only one problem. After all, traveling at the speed of light is actually a snail's pace in cosmic space. It is 100,000 light-years across our own Galaxy of stars. And there are seventy-five to one hundred million other Galaxies like our own or greater! Pardon me, I must correct myself; according to the findings of the new two-hundred-inch telescope, about one hundred and seventy-five million other Galaxies!

"It is probably two hundred to three hundred million light-years out to the curved edge of the entire universe. So we won't be such rapid travelers, Greg, as it might seem. But, after all, when we travel at the speed of light, time stands still, Greg; don't forget that. It is one of the cardinal principles of relativity."

"What exactly do we do with ourselves on this journey, Art? It isn't clear to me."

"Don't let's go into that," replied Woodlock seriously. "I don't want to deceive you, Greg. This whole adventure is a mad gamble of discovery and chance. It may be black death and oblivion and failure. We may never get back. And if we do"—Woodlock squared his shoulders, perhaps to hide an involuntary shiver—"it may be that 100,000 years or more will have passed in the history of the earth. You must remember what I just said about relativity."

"A hundred thousand years? No!" exclaimed Gregory, his face blanching. "Why, Professor Peck, and the whole human race may be dead by that time! Who'll reintegrate us and get us back?" Gregory's eyes nearly sprang from their sockets.

"I'm going to leave the problem to Peck and Mitchell," rejoined Woodlock. "Once the act is accomplished and we have 'eloped' from the earth, so to speak, they can do nothing to stop us, and they'll put their brains on the job of returning us at the proper time."

"But won't they do it immediately, as we do Dog Star, and nip our little elopement right in the bud?" asked Gregory excitedly.

Woodlock smiled a wry smile. "I've figured out how to fix that. We will use for our key matrix some of that new radiumized beryllium we created, which, you'll recall, has the property of slow change. I've already experimented with it, and I can guarantee it will be at least ten thousand years before it will stabilize sufficiently so as to permit the imbedded matrix marks to be used effectively to bring us back. All this I'll carefully explain in writing to Peck and Mitchell."

"Better put it on parchment," remarked Gregory in a dull daze of confusion. "It will have to last on earth for a long time."

"Parchment!" exclaimed Woodlock scornfully. "That's far too destructible

by time. I'll have to carve part of the message in lead, if I want it to last ten thousand years."

Gregory was quaking.

"Let's get going!" said Woodlock, a little feverishly. "There's no time to lose. I've set The Day for Sunday next."

"THAT reminds me," said Gregory after a while, "I think this fellow Ackerman, your rival, to whom Amelia came near being engaged, has been trying to bribe Terry. I arrived at the hangar yesterday just as he was leaving, and Terry was swearing like a teamster at him. Before Ackerman saw me he called out to Terry he'd be back Sunday to get his answer. There's something doing in his mind."

Woodlock glared silently for a minute. "He's just scientist enough," he mused, "to understand about how I would feel, and after reading the reports that have come out he may guess that I'm going to shoot myself out into space and may want to take Amelia with me. Amelia probably hasn't been able to parry him quite successfully, if he has questioned her.

Woodlock arose, filled his pipe, and paced about for a few minutes. Suddenly he sat down at his desk. "I'll make The Day Saturday," he announced with decision. "We can't let any silly fool like Ackerman get in our way. He probably hopes I'll go and leave Amelia to him.

"To work, Greg, to work! We will probably not get three hours a night for sleep before we go. Put your affairs in order, and make three very perfect radiumized beryllium plates at once. I want to pick the best of the three with the aid of a special ray machine. We'll soon be all set to go. Greg, I'm thrilled to the toenails! I've dreamed of this since I was a boy!" Woodlock looked like an eagle poised for flight.

VII.

AS WOODLOCK plotted the "elopement," Terry, an hour after Big Bertha had sent the three human beings out into space, would dispatch a telegram to Professor Peck asking his immediate presence. On his arrival, Terry would hand over the long thirty-two-page letter Woodlock had written, and he would also be shown a leaden casket in which rested six leaden plates engraved with a message intended for such human creatures, if any, who would inhabit the earth about 100,000 years from now. These creatures—it was hoped—would be at least as intelligent as the people of to-day, with scientists competent to build a duplicate of Big Bertha, from the instructions given, and then utilize the radiumized beryllium plate, the key matrix, which was also to be inclosed in the leaden casket, to be used to bring back to earth the three travelers; who would of course be almost as young as when they left, according to Einstein principles of relativity.

For two days Woodlock was deeply immersed in the details of these important messages, also one to his backer, the chewing-gum magnate, and the supervision of the carving on leaden plates; also the selection of a rock-ribbed hilltop near Springfield, as the place to be suggested to Professor Peck to erect the granite chamber in which the lead casket would be housed.

On the evening of the second day, Gregory Slocum was resting from his labors and smoking a pipe, when he suddenly dryly remarked: "I may be a *neutron*, all right, Art, and you have all the positive stuff, but I'll be damned if I would act like you."

"What do you mean?" asked Woodlock absently, from his desk chair.

"Well," replied Gregory, blowing a cloud of tobacco smoke toward the ceiling; "here you are, engaged to a lovely

woman in the flesh, whom you are planning within the week to reduce to nothing more personal than ions, light-rays, and yet you spend your last days in the flesh for 100,000 years, hidden away from your beloved one, who may, as a matter of fact, already be kidnaped by your rival, Ackerman."

Woodlock moved restlessly in his chair. "I saw her for a few hours last week," he said, "and she's absolutely game to go. She's a grand girl, and—well, I wish I wasn't such a miserable slave to science."

"Take my advice, Art," broke in Gregory earnestly, "go to her to-night, marry her quietly, and bring her out here to live right with us, so that no hitch can develop."

"What hitch?" Woodlock queried.

"Didn't I tell you your old rival, Ackerman, is on your trail for some reason?"

"Oh, heck!" rejoined Woodlock contemptuously. "What could he do?"

"You are leaving your girl somewhere miles off, and if he should kidnap her, where would you be at?" boomed Gregory. "Swell *positron* you are, all right! I'm only a poor little *neutron,* but I'll be gosh-darned if I wouldn't get a little more excited than you about a lovely girl like Amelia, whose curves after Saturday won't be visible to you for the next 100,000 years! The first 100,000 years will be the hardest, remember!"

"Shut up!" called out Woodlock. He ate his dinner in silence, however, and put on his coat. "Guess you're right, Greg. I'm going to get in the car and speed down to Connecticut and see Amelia. If she'll marry me right away, I'll take that advice, too Bye-bye!"

HE HAD not been gone an hour when the telephone rang. Amelia's agitated voice was at the other end.

"Quick! Quick! I'm talking from a pay station on the Boston Post Road. Ackerman has run away with me in a car. I'm in a filling station here. I think he's going to Boston. Oh, where's Art?"

"He left an hour ago to go to you, Amelia. Quick, tell me, what kind of a car are you in and exactly where are you?"

"It's a maroon sedan, and this place is called the Green Bower, and it's just north of Westport. What shall I do? Hurry! He's threatened to dynamite the Big Bertha if I don't go with him quietly."

"He has, has he?" Gregory snorted. "Well you're a spunky girl, and I'm up here to defend the hangar—so defy him, Amelia; we'll take the risk. Refuse to move off the place. Scream if he uses force. I'll have the police there in fifteen minutes Do you hear me?"

But the telephone gave no further answer. Swiftly Gregory called the State police at Westport. It seemed to take hours, but he got action at last. Then he phoned Amelia's home, leaving word that the instant Woodlock arrived he was to call Gregory.

In half an hour, Woodlock called, and then Gregory sent him headlong into the night for the Green Bower. Meantime Gregory had also asked for a special guard for the hangar where Big Bertha was housed.

When Woodlock arrived at the Green Bower, he found Amelia semihysterical, amid some State troopers. Ackerman had left her after she had made her stand against going with him farther, saying that he had it all arranged to blow up Big Bertha that night and that nothing could prevent it.

Sending the police on Ackerman's trail, Woodlock loaded Amelia on his car and sped toward Springfield. She wouldn't stay in the city and insisted on going to the hangar in the landing field with him Arranging for a pow-

erful searchlight to be trained on the hangar all night, for the benefit of the guard, they remained close to their precious apparatus until near midnight.

"I've had a marriage license in my pocket for two weeks," said Woodlock to Amelia, "but I feel for some reason like being married to-night."

"Indeed!" said Amelia. "And how could you accomplish that?"

"You forget that I had Terry made into a justice of the peace in this little town, in order to help in the problem of protecting this hangar from small boys. We could be married in five minutes."

"That's doing the thing with something like the speed of light, isn't it, Art?" Amelia smiled. "What is that speed?"

"186,000 miles per second," replied Woodlock.

"Well, if I'm going on the journey with you at that speed, I should complain if we marry on five minutes' notice, should I?"

"Darling, you're something rare. I love you. He kissed her. "Hey, Terry!"

Poor old lumbering Terry! As if there hadn't been enough excitement for one night! His stiff joints positively creaking, Terry ran for his book of instructions, but after a while gave up trying to understand them and followed Woodlock's simple directions. Gregory had meantime arrived and served as a witness

"I pronounsch you man and wife!" mouthed Terry loyally and loudly; and that was that.

"Let's spend a few minutes of our honeymoon up in the sphere where you've spent so much time!" begged Amelia. "You know I've never seen it. You'd let me go up, wouldn't you?"

SO THEY mounted the ladder, and up in the weird, spherical room—with the generators going, for Woodlock wanted to have Amelia see how things worked—they kissed with a new feeling of possession and of a new human fate awaiting them on Saturday.

"How's married life, Art?" called Gregory from the negative sphere over the short-wave radio set.

"Great!" rejoined Woodlock. "What's your potential?"

"Zero on love," called back Gregory playfully, "but 800,000 volts on the generators, if that's what you're asking."

Just then could be heard shouts. Terry's gruff bass was at top pitch. Then came an explosion, but it was down the landing field some distance. The spheres on their cylinders rocked, and there was a great sound of shattered glass on the sides of the hangar.

"Excuse me for a few minutes," said Woodlock. "Guess there's a short circuit."

Never had Woodlock climbed down the ladder so rapidly. "Stay up there—you're quite safe," he called back to Amelia.

Just outside the hangar, at the rear, the guards and headlights were concentrating. There in the midst of the shattered glass lay Ackerman, burned and unconscious. In his hand was a charred remnant of annunciator wire, which he had attempted to lay through a crevice beside a projecting steel beam at the base of the hangar; a wire they found connected with a detonator and dynamite.

The electricity of the generators, which had been developed slightly merely for Amelia's interest, had prematurely set off the dynamite stick down the field, but the tiny wires had also transmitted to Ackerman's body a serious shock before they burned up. Only the thinness of the wires he had used had kept Ackerman from instant death.

VIII.

"BIG BERTHA knew her enemy and gave it to him," Gregory said grimly to Woodlock, gripping him by the shoulder, as the guards carried Ackerman toward an ambulance. "Let's get away from here right now—before Amelia finds out what's happened"

Woodlock stood still in his tracks.

"Greg," he said suddenly, "we really are all set to go, aren't we? We've done every little thing, haven't we?"

"Yes, Art," replied Gregory; "we have. We're absolutely set"

"Well, then," Woodlock firmly returned, "I've made up my mind: We go at dawn to-morrow."

"What!" ejaculated Gregory.

"You heard me the first time," said Woodlock succinctly. "I'm taking no more chances. Ackerman may get out of the hospital in a few days, hell-bent to checkmate us Amelia and I will stay up in the sphere, and you can simply let the generators continue. They're going now, and we probably have over two million potential already. By four in the morning, we'll have the top load. My mind's made up, Greg. You take the car and drive to the bungalow and do a few last things. Bring the big sealed envelope for Professor Peck. At dawn to-morrow!"

Gregory moved off as if in a trance, and Woodlock took to himself the task of giving poor old Terry the greatest shock of his life, but in homeopathic doses He instructed him with the very greatest care, until Terry knew in a perfectly standardized way precisely what were the simple things he had to do

After all, these were very few The new automatic cut-offs on the generators insured a stop at the proper point, and there was a new arrangement which enabled Terry to throw the fatal switch from his own ramshackle corner in the hangar, so that nothing strange might disturb his routine.

Then Woodlock went up the ladder where Amelia lay upon the simple couch, propped up by leather pillows.

Gathering her into his arms, he said: "Dearest little bride, would you object to spending our first honeymoon night here?"

"I'd love it!" cried Amelia. "It's so romantically appropriate; the thought occurred to me while you were gone. What was the trouble?"

"A little trouble with the brushes. It has happened before; all is well now."

Solemnly then, Woodlock continued: "And would you object if at dawn to-morrow we started on our great journey —instead of Saturday?"

Amelia looked up at him, probing deep into his intently serious eyes. Her hand stole to his cheek.

"You are always like the speed of light," she said wonderingly; "incredibly swift and incredibly sure of yourself. I'll go any time, anywhere, anyway that you ask."

And so two human beings held close to each other's arms that night in a weird aluminum ball high up in the air, while millions of volts of electricity lodged themselves in their bodies on their wedding night; so that if any one from the outside had touched them they would have been seared and blackened as if with lightning

All night long the generators rumbled on tirelessly, lifting more and more voltage upward into the negative and positive spheres Woodlock and Amelia felt more than one kind of ecstasy, for not only was this to be their nuptial from an earthly point of view, but also from an unearthly point of view.

Almost as if he were an alarm clock, Woodlock awoke about dawn His ears were so attuned to the singing of the generators and the hum of the instruments as they approached the maximum charge that they were his alarm.

"There, Greg?" he called over the short-wave radio.

"Sure; all set."

"Lock out section two in the tube as usual," said Woodlock quietly. "Are you there, Terry?"

He was not, but three more calls brought him. "Get ready to throw your switch at exactly four thirty, Terry. Repeat the order to me."

"I throw the switch at exactly four thirty," replied Terry.

"What does your watch say?"

"Four o'clock and one minute."

"Right, Terry. Bye-bye!"

TERRY didn't understand the good-by, but went to his post. Then three human beings crowded into the thick glass compartment; it was a tight squeeze. The gray light of dawn was only meagerly reflected inside, and they looked at each other queerly, Amelia clinging calmly to Woodlock's arm. Woodlock looked at his watch. Five minutes to go. He held open with a short length of hemp the heavy pyrex-glass door, in order that there might be air to breathe until the last minute.

"Take your last look at the earth," Gregory said jocosely, gazing down into the hangar.

"Shut up, Greg!" replied Woodlock with the irritability of a man who has his mind on a supremely critical thing.

Looking at his watch for a few minutes in dead silence, he suddenly clicked shut the door. The air rapidly became stifling. Perspiration gathered on their faces. Their breathing came hard.

Then, like the mighty crash of a new world being born, an utterly overwhelming, leaping, consuming cold flame, 16,000,000 volts strong, was upon them, leaving scarcely the margin of a fraction of an instant for realization of its presence before all consciousness was blotted out.

Three human beings, the elemental, fundamental stuff of life, *positron*, *electron*, and *neutron*, had been thrown toward outer space with a speed so great that they were already beyond the small wisp of a moon, which was still in the sky, before Terry took his great clumsy hands off the switch which had started them on their way.

The die was cast—the Einstein express was making its initial trip, with three passengers who were eager for a vacation from the ridiculous little earth, which was the little village of the universe. They were on their way to the celestial big cities, with all that they might portend. How would the passengers feel? What would they encounter? Or was all to be black extinction?

To be continued.

The Blue Earthman

A tale of the far future where men fight a double battle against ruthless living enemies—and death!

by Frank Belknap Long, Jr.

KELLKALL, the white Earthman, sat staring grimly through a window of transparent kerosil at the luminous bulk of the Martian tube city. It loomed obscurely through the prismatic water vapors, its circular base slowly rising and falling in the seething, stupendous tides

The flat black death shell which contained his thinly-clad body revolved rapidly as it skimmed the turbulent waters. He sat in the pilot chamber, sorrow-shadowed, consumed with torment. His hand grasped firmly a collodion cylinder which solidified with unfailing accuracy the magnetic curves of his hazardous, arbitrary course.

The great waves drew the shell forward at incalculable tangents, but as the solidified curves emerged from the magnet beneath the cylinder he broke them off, studied them, and corrected his course accordingly By dint of ceaseless manipulations of the steering mechanism he had succeeded in correcting the arbitrary pull of the waves, and despite enormous obstacles was slowly approaching his goal

Tears gleamed on the white Earthman's cheeks as he turned the cylinder about in his unsteady hand. Directly behind him a white Earthwoman sat staring out through the kerosil window with unseeing eyes. She rested rigidly on a revolving dais of black metal, her lovely tapering fingers clutching at her breast as her body swirled Her fingers clutched a widening ribbon of scarlet. The woman was Kellkall's life companion.

From intense magnetic fields in the depths of enormous, oil-immersed wave guns on the defense level of the Martian tube a deadly barrage of released positrons had issued in a metal-piercing stream. The waves of freed atomic energy had swept above and beneath the death shell as it swirled toward its objective, menacing it at every advance, and filling Kellkall's mind with grim terror and presentiment.

The widening ribbon of scarlet became a torrential flood and the slim figure on the dais swayed, toppled over sideways. Kellkall turned his head for an instant in mute agony. A metal-piercing positron wave had claimed and destroyed forever the one redeeming glory in his meager, war-envenomed existence.

A burning despair filled his heart as his gaze returned to the circular window in the summit of the shell. Goaded to an abnormal awareness by the grim tragedy which had overtaken him he envisioned agonizingly for an instant all the incidents associated with the life and death of the woman on the dais

He recalled the bright glory which had brought them together, the somber and hideous sequel to his destiny as a death-shell pilot, the terrible menace of the Martian invaders in their floating-tube cities, and the long, valiant struggle of his own fierce race to repel and conquer.

Suddenly Kellkall was aware of a figure which flew at his torturer. There was a thud, then silence. . . .

Back across the somberly-shadowed years his mind leaped as the death shell skimmed the seething ocean, in proximity to the deadly atomic barrage, with ascents and dives, and wild, sudden, plunges that sent the body behind him spinning hideously in the green-lighted interior of the flat shell.

Kellkall, the white Earthman, knew that his heritage was a proud and glorious one. Of fierce, obdurate lineage were the Earthmen, fashioned of imperishable clay. Competitive as the most ferocious of the large mammals and capable of infinite self-deception, they had yet dared so boldly, dreamed so gloriously that an aura of sublimity hovered about them, endowing even

their defects and vices with a kind of unhallowed grandeur

Their survival capacity alone was worthy of respect. For ten million years they had resisted all changes in the Earth's construction—changes in the atmosphere and in the very soil which nourished and sustained them. The solar orb which had hurled the planets forth in the dark night of time was slowly, relentlessly reclaiming its original body substance. One by one the planets were returning to the Sun, with rapidly-diminishing orbits and retarded revolutions.

Mercury was a gas; Venus, a gaseous nebula. The terrestrial sphere had ceased to revolve on its axis, and one half of its surface was bathed in perpetual darkness. Its orbit diminished so rapidly as it drew near to the Sun that the seasons followed one another in ten-day sequences, and winter was a period of intolerable heat surpassed only by the furnacelike torridity of the summer months throughout the entire northern hemisphere on the Sunward side.

But these changes Kellkall's heroic race had endured with fortitude and an incredible ingenuity. Though the continents had become uninhabitable the white Earthmen had built towering shell cities on the turbulent, boiling seas. Marvelously terraced and aglcam with armaments these immense floating metropolises explored the oceans of the Sunward world, moving slowly between the continents, and bearing millions of human inhabitants, domesticated animals, mechanical servitors, and hermetically-sealed dwellings of metal and crystal

On the Earth's dark side there reigned a never-ceasing cold. But even there, beneath the faint glow of far white stars Kellkall's intrepid kind had survived and flourished. The seas of the Earth's hidden face were not distorted by seething, boiling tides. They were cold and deep and silent, and silently upon them floated the mile-wide metropolises of the blue Earthmen.

Millions of years of estrangement and isolation had changed the blue Earthmen profoundly, altering the very texture of their skins and endowing them with perceptive faculties so unusual that the white Earthmen shunned and feared them, and waged relentless war upon them when they ventured on missions of malignant conquest over the rim of the light world.

The floating bell-shaped war craft of the blue Earthmen sometimes emerged on the Sunward seas and moved in battle formation upon the shell cities of the light dwellers, but invariably they were repelled by the superior techniques of the war guides and war pilots in the revolving death shells.

As the shell cities of the white Earthmen moved majestically through the churning seas, ablaze with lights which vied with the Sun's intolerable glare they were accompanied by thousands of death shells and submarine flame craft.

IN THE MIDST of black mountainous seas the green-lighted shell cities had towered resplendently in the years of Kellkall's youth, awe-provoking symbols of man's invincible spirit when oppressed by the dark hostility of nature and his own relentless kind.

From birth Kellkall had been scientifically conditioned for his future profession. In childhood he had been taught the arts and sciences associated with war and war-making, and had become a competent defender of the moving tower of power and glory which had selected his parentage, his career, and his life companion.

The ruling guides and masters of the great tower had permitted him to stand for a little hour in the sunlight and to speak aloud the name of his dear, selected one. So great was his gratitude for that glorious and consoling con-

cession that he served willingly thereafter in the bleak, cramped, and armament-congested interior of the black death shell, piloting his vessel through the high and menacing seas during all the brief, bright years of his young manhood—moving on as a scout and defender before the immense metropolis as it passed from east to west through the waters of the Sunward world

Once a year his dear one had joined him in the dark shell, and once a year his weariness had fallen from him, and he had shed his heavy yoke of servitude in her wondrously consoling presence. Then she had left him, and he had moved again against the dark people, bursting their war craft with atomic tubes, spreading grim havoc among the audacious challengers of the white Earthman's light-world supremacy.

But all that was altered now. From space the tube cities of the Martians had fallen into the boiling Earth seas; twisted, hideous protuberances rising hundreds of feet above the swirling tides, and descending far into the depths

As the Earth plunged toward the Sun the blight of an alien visitation rested upon it. Twelve of the light world's eighteen towering cities had succumbed to the pestilential space spores of the Martians. The Martians had made themselves masters of the terrestrial sphere. In the great shell cities the white Earthmen had perished in piercing agonies, and the shells had become plague receptacles buffeted by stupendous seas, mile-high crypts of contagion and black corruption surging pilotless across the world.

And on the dark face the flat teeming cities of the blue Earthmen became openly corrupt and festering beneath the far, pale stars, and the far-flung network of communications which had connected them ceased to function. Between these cities and the cities of the white people there arose the sinister tubes of the Martians, until all the seas were dark with the alien habitations that had journeyed Earthward across wide gulfs of space

The Martians had never revealed themselves to the Earthmen. Having journeyed in legions through space in their cavernous tubular colonies they harbored vast projects of colonization and expansion. In the depths of their ocean-tossed strongholds they pitted their cold, inscrutable endowments against the war techniques of the floating Earthman cities.

No Earthman had ever seen a Martian, but the Martians had disintegrated the protective heat shells which spanned the floating cities, and removed thousands of dead Earthmen for purposes of research and experimentation. They had even acquired the destructive Earthmen's war techniques, and had employed them remorselessly against the remaining cities.

Kellkall knew that far behind his wave-tossed shell the huge towering bulk of his own home city moved slowly westward. It moved to join the bell-shaped war shells of the blue Earthmen, the unregenerate, hideous ones whom Kellkall's kind had always despised and hated with a raging, consuming hate. But the supremacy and survival of the race itself was now imperiled, and in utter desperation the light dwellers had joined forces with the blue Earthmen against the common enemy.

The remaining cities of the white Earthmen were moving in war formation across the tide-distorted northwestern ocean toward the dark side of the planet. Between the moving metropolises and the blue Earthmen cities a dozen scattered tube colonies arose in menacing opposition.

Kellkall's face hardened, and an anger so intense that it seemed akin to madness flamed in his eyes as he recovered from the swift stab of tortured memory, and bent grimly above the steering

mechanism. The death shell was now directly beneath the twisted, luminous tube city of the Martians. Cradled in the trough of a stupendous wave, it pointed skyward in Lilliputian menace. Down from the towering Martian city poured thin death rays; a lethal stream of trillions of rapidly-exploding and disappearing positrons.

The death shell was riddled with the metal-piercing barrage. The food in the circular *agerin* containers in the stem of the vessel shriveled and then dissolved. The white, recumbent body of Kellkall's life companion moved for an instant as another wave pierced her in a pitiful ghastly mockery of the movements of life. Then the artificially-energized limbs went limp again, and the white Earthwoman swayed and sagged in a distorted attitude against a flame torpedo container beside a tier of exploded glass shells.

Kellkall did not turn his head again. His teeth sank deeply into his lower lip as he leaned sideways, and placed his hand on the wedge-shaped lever which controlled the atomic wave gun in the death shell's summit. The atomic guns in the moving cities behind him were as powerful as the stolen guns of the Martians, but the gun in the death shell was a small, inferior weapon. With it he could discharge upward into the stupendous tube a single brief stream of positrons. But the Martians were more vulnerable than the Earthman, and the death barrage from the tiny black shell had ripped two of their tube cities asunder, and filled the oceans with crimson filaments.

Kellkall had stared out through the kerosil window at the wreckage of the sundered tubes. For a brief, never-to-be-forgotten instant he had looked into the great central core of a luminous tube dividing; had glimpsed strange shapes, and hideous dark shadows etched with fire. Then the great tube had vanished into the depths, and upon the waters a crimson froth had lingered and the red filaments had moved like malign serpents over the seething main. No Earthman had ever seen a Martian; but Kellkall had glimpsed for an instant the shadowy substance behind the veil.

The revolving death shell moved upon the waters in rapidly-widening circles. In the titan bulk above lights flashed; from the twisted gleaming walls of the tube there streamed banners of green and orange flame. The great wave rose suddenly, carrying the midget shell with it, and as though in response to the turbulent upward surge the wave gun in the summit spoke. From the whirling shell the deadly positron stream shot upward, straight into the gleaming, spray-drenched tube city of the Martian invaders.

Kellkall never knew the result of that desperate, audacious assault in the midst of churning seas and the awful menace of down-streaming positrons. He was leaning grimly forward with his hand on the wedge-shaped lever and his eyes straining to pierce the sea ferment behind the drenched kerosil when the death shell rose suddenly into the air, descended and rose again.

At the same instant a hideous splintering and sundering ran the length of the vessel. Kellkall felt a sharp stab in his lungs, a flooding pain in the region of his spine. For an instant he swayed dizzily beside the steering mechanism. Then the pain spread swiftly throughout his body, and oblivion engulfed him.

WHEN CONSCIOUSNESS returned, he was lying on something hard, and mobile, staring upward at a glimmering blue surface that seemed to recede as he gazed at it. For a long moment he remained without motion, passively staring at the shining fabric above him. Then an intenser realization took possession of his mind, and an exclamation of wonder and incredulity burst from him.

He turned about on his mobile support. An utterly alien and stupefying sight met his gaze. All about him were fantastic cubes and spirals—blue-lighted metallic globes that revolved slowly as he stared at them, long reed-like tubes glowing with a lurid incandescence, and dozens of thin, luminous filaments of heated metal that interlaced in intricate fashion high in the air above him. The air in the chamber was dry and very cold.

As he stared in stunned amazement a tall, tunic-clad form emerged from the shadows behind him, and advanced to where he was lying. The form was abnormally tall, with a wrinkled skin of bluish hue, and a sinisterly hostile face whose malignant lines were as rigid as a mask of clay. His serrated metal tunic reflected the lights of the gleaming mechanisms in the vicinity of the moving support.

The tall form stared downward at the bewildered white Earthman without compassion or pity, and when he spoke the harsh metallic tones of his voice were hideous harmony with the merciless light in his narrowed, evil eyes.

"Light man," he said. "I have rescued you from the sea—you and your dead companion. I threw open the basal valves, and drew you into the vessel through a tripped-drift cylinder. The Martian ray guns rent your shell asunder."

His lips opened in a malignant smile utterly destitute of mirth. "It is fortunate you were wearing a wave sheath of atomic *zut*. Without it you would have shriveled up like some flabby worm of the sea. You are a pitiful, weak creature, light man."

A swift wave of anger convulsed Kellkall's being. He struggled to a sitting posture. "I do not like your tone, shadow dweller. There should be no enmity between us, for we serve against a common foe."

The blue Earthman drew himself up contemptuously. "Your people are weak, sentimental fools," he said. "I do not know why we agreed to help you. We could have subdued the Martians without the aid of your poorly-equipped death shells and ineffective flame craft. You may be sure that I do not respect the covenant of war which unites us. I am my own master and I do as I please."

He turned swiftly and made a beckoning gesture with his long right arm. Instantly the two smaller blue Earthmen emerged from the shadows behind the interlacing network of spirals, tubes and incandescent pipes, and advanced swiftly toward him. They were supporting the limp white form of Kellkall's life companion.

When Kellkall recognized the woman, a cry of wonder burst from his lips. He swayed dizzily on the revolving support, his being pervaded by a strange commingling of joy and dread. The Earth-woman's green eyes were open, and her lips moved pitifully as the two dragged her forward.

With a harsh, contemptuous laugh the tall blue Earthman drew near to her, encircled her waist with his arm. Instantly her guides stepped back, relinquishing their burden without reluctance to their grim commander.

Kellkall's body stiffened and he sprang from the support with a protesting cry. Without uttering a syllable the tall blue Earthman stretched forth his free arm, and gripped the white Earthman's forehead.

The sudden contact was deadly and effective. An electric shock went through Kellkall's body. With a groan he fell to his knees, slumped convulsively. Stabs of pain went through his limbs. The blue Earthman stood for a moment looking down at him in infinite contempt.

"I have restored her to life, light man," he said. "Hereafter she will serve me as I cruise the seas of the Sunward world."

He beckoned to his two servitors. "Stretch him on the table of the Sun in the sky chamber," he commanded.

Kellkall was recovering from the electric charge. He groaned, struggled to free himself. But the two dark servitors held him in a grip of iron. The tall blue Earthman drew close to him till he was staring directly into his wrath-convulsed countenance.

"When I was a child, light man," he said, "your kind captured and tortured my eight brothers by binding them on a Sun table and exposing them to the awful glare of the solar orb. You labor and amuse yourselves under a hideous Sun, light man"

His arm tightened about the woman as he spoke and he smiled grimly. "This is not an ordinary bell vessel. I have equipped it with light-man instruments of torture. My masters think I serve them and your loathsome kind, but I do not hate the Martians. It is the light man I hate. I have made myself strong beneath the stars, and while my kind and your kind labor futilely together to destroy the Martians I pursue a solitary vengeance."

Kellkall was gazing in torment at the pale woman in the blue Earthman's clasp Though she returned his stare, looking deeply into his eyes, there was no recognition in her gaze.

"I have destroyed two hundred of your kind," boasted the blue Earthman, in exultant triumph "I have bound them upon the Sun table and watched them perish in agony. But I have never before captured a white Earthwoman."

A proud flush darkened his gaunt, blue cheeks. "I have healed the wound in her bosom with a vegetable coagulant, and galvanically restored her motor reflexes Though her brain will never function normally again, she will console me in my lonely pilgrimages."

The light of a sinister mockery flamed in his eyes. Swiftly he turned his head, and laid his thin, dry lips against the woman's white cheek. She struggled feebly, and her eyes widened in mindless protest.

Kellkall resisted frenziedly, but all his efforts to free himself were futile.

"Take him to the Sun table," commanded the blue Earthman again.

Kellkall was lifted and carried between gleaming shapes that swam dizzily before his tortured vision. He was carried between revolving tubes and spirals, flashing light recorders, and magnetic measuring rods that spiraled upward toward the slowly-expanding and contracting metallic ceiling of the bell-shaped war craft.

Then the dark servitors lifted him relentlessly upon a long metal slab and stripped the thin tunic from his body. A great copper cylinder with a crystal eyepiece was swung hideously toward him and attached by thin filaments to his forehead.

There ensued a low thrumming sound and then light, blinding, intolerable light flooded his eyelids. Never had he experienced torture so awful and atrocious. It seemed as though a mocking voice spoke to him, saying. "You will never arise from this death, for you are bound by a merciless vengeance."

As he writhed in torment on the table the servitors opened widely the shuttered sky window far above him, and upon his exposed flesh there fell the blight of a withering heat. For a space there was no sound other than the slow, harsh breathing of the blue Earthmen as they watched his agony, and the rhythmic vibration of the great bell vessel as it moved slowly through the seething seas.

Then a slim, pale form emerged swiftly between the tubes and spirals and advanced upon the table. Without uttering a word a woman who had died raised her arm, and plunged a metallic death dart deeply between the shoulder blades of the nearest dark servitor. With a cry he stiffened, and lurched sideways.

The woman stabbed him again, with merciless precision, in the small of his back

He was dead when the other servitor turned. Straight into a startled eye the long dart went. The woman did not wince as she withdrew the poisoned weapon from the turning one's pupil and plunged it swiftly into his throat. With a raw cry he staggered backward, and slumped jerkily to the floor.

AS THOUGH awakening from some hideous dream the woman turned about, dropped the dart, and bent above Kellkall. With a moan she covered his twisting torso with her own, fumbling frantically with the thin binding filaments as the withering heat burned into the soft flesh of her back.

The bands came free and Kellkall's body moved sideways on the slab. The woman swung the cylinder upward, and Kellkall's eyes opened. He gazed on a blackness more intolerable than the glare of the great merciless sun.

But the woman's voice calmed him strangely, soothed the agony which racked him. Her arms crept about his shoulders; her mouth merged with his in a long, lingering kiss.

"Loomono," he murmured, when she withdrew a pace. "I thought I would never hear your sweet voice again. Have you returned from the dead?"

"I do not know, my dear one," murmured the white Earthwoman, smoothing his temples with her palms. "I came from an immense distance to reach you. All was darkness and agony until I heard your dear voice calling. Then gradually I became aware of sounds and movements, and a thin film wavered for a moment before my eyes. Through it I saw your face dimly. I strained to pierce the veil, and a hideous, evil face rose up before me. It was the face of a blue Earthman. He was speaking to me, telling me he had rescued me from the sea, and that I must serve him.

"The instinctive loathing which we all feel in the presence of the dwellers in darkness rose up in me as he spoke, and I cast swiftly about for an implement of defense. All about me strange and alien shapes towered, and for a moment a great despair rested upon me. Then my eye chanced to fall on the poison dart which reposed in a sheath on his right shoulder. I seized it, and stabbed him. He fell swiftly to his knees and expired with a gasp of agony. In great loathing I stabbed him again and again.

"Then I heard you calling. I came, Kellkall. We are together again."

Valiantly Kellkall strove to conceal his great torment. She clung to him, weeping, pale with anguish.

"Your body, Loomono. Is it——"

"I have looked at my body," said the woman, in a tone of sublime courage. "It is grievously wounded. There is a fatal wound in my bosom which has been healed by the coagulant which the dwellers in darkness smear on their galvanized skin when our death shells tear them. I have endured positron fire, Kellkall. I have truly died. When the galvanized ones move about they are lost, mindless shadows."

"But you are really alive," murmured Kellkall. "Your mind—has been restored."

"Yes, Kellkall. But I know I shall die again. It is only by a great effort of will that I remain here beside you. My perceptions are not clear, not sharp. There is even now a widening gulf between us. When I died my brain changed. The circulation withdrew from the living cells and some of the cells withered, died. We must face the truth unflinchingly, Kellkall. Only for a moment will we be together again. Love as great as ours can work miracles, and perhaps survive the death of our bodies, but it cannot restore the brain when the cells have died. My mind wanders, my dear one, even now. By the strength of my will I have held fast to a

single thread of thought images, and from a deep abyss of confusion and pain I speak to you, Kellkall But even now the thread is breaking—breaking——"

She swayed as she spoke, and her eyes dimmed With a cry, Kellkall clutched her more tightly to him "I shall not leave you, Loomono," he murmured. "I shall go with you into the darkness. My eyes are already dark, and when you go——"

The words froze on his lips, as the bell vessel lurched sharply The spiral network above the slab seemed to quiver and swoop and a terrific shock ran through the vessel There was an additional violent concussion as the framework of the great craft buckled, as though from the impact of some ponderous object in the seas without.

The two stricken lovers were dashed sharply downward. The bell vessel rose cumbersomely as they careened along the nearly-vertical floor toward the stern compartments As Kellkall felt his arms tightened frantically about the slim form of the white Earthwoman, and she clung to him with unabated fervor They were still together when their bodies crashed against a wall of metal, and went limp forever.

THE MARTIAN grew perplexed as he drew from the shattered bell vessel the tiny bodies of the blue and white Earthmen The vessel lay immersed in a glimmering sea net on a sloping, seaward examination screen on the defense level of the Martian tube city. Seizing the slack of the net with his luminous tentacles the great Martian tilted the broken vessel until all its human contents fell out upon the smooth, gleaming screen.

He picked up the little figures and examined them intently one by one. By his side another of his kind squatted, his immense hooded brain vibrant with a consuming curiosity.

The examining Martian laid a wet tentacle on the grooved forebrain of his companion.

"The dark ones are very evil, Shalugne," he conveyed. "But these poor little white ones did not fear death. Observe the great wonder on their faces. Wonder and agony commingled. They passed into the darkness without fear because they knew intimately the meaning of that strange, elusive emotion which the Earthpeople call love."

The listening Martian laid his tentacle on the net examiner's forebrain. "Yes, that is very true. It is apparently a very obscure, a very curious emotion. It seems to transcend death."

"We have had good fishing at any rate," commented the net examiner. "So long as we lower the nets in double tiers and keep them carefully spread, we shall have little to fear from the death vessels of the Earthmen."

I stood in a daze. Every time I tried to move I was slammed back against the wall.

Triple-Geared

by Stanton A. Coblentz

WHEN I set sail in January, 1951, on a pleasure cruise to the South Seas, I little anticipated the changes that were to occur in the world and in my own life. Weary of the wearing routine of city existence, I had determined to leave my medical practice in New York for a period of six months, for it seemed to me that, now that I was approaching fifty and felt the strain of a rushed career beginning to tell upon me, I was entitled to the first real vacation I had enjoyed since college days.

It was with a sense of boundless relief that I stood at the rail of the motor ship *Tahiti* in the cold dusk of a midwinter's afternoon and watched while the vessel made her way slowly down the bay and past the hundred-story spires of Manhattan.

Had I known that eleven years were to pass before I should look again upon those tower walls—eleven years of changes so phenomenal that—— But let me not rush on ahead of myself. I shall recount the events all in their natural order, and first I must tell of the fate that overtook the *Tahiti*, and of my own desolate experiences.

I do not claim that my adventure was unprecedented in nautical records—only that it was heart-rending and terrible.

At two in the morning of the seventeenth of February, the *Tahiti* struck a sunken reef, evidently thrown up by a recent submarine disturbance midway between Samoa and the Cook Islands. So severe was the blow that the order "Abandon ship!" was immediately sounded—and in less than an hour the great liner had disappeared beneath the Pacific waves.

Amid the disturbance following the collision, when the ship's lights failed and men with torches ran screaming through the darkness of the listing decks, it was impossible to launch the lifeboats. The only hope was to don a life belt and throw one's self into the mild, warm seas, on the off chance of being picked up by a passing steamer.

How many perished in this attempt will never be known—I can only say that I was more fortunate than most, and, aided by several drifting spars, which I lashed together to form a rude raft, contrived to keep afloat.

I shall not linger over the sequel, how, after three days, when I had all but perished of hunger and thirst, I was washed ashore on the rocky islet which I named Forlorn Reef; how I found it to be uninhabited except by sea birds; how I discovered water in a little spring, and food in the coconut palms near the beach, as well as in mussels and other shellfish. It will be best to pass over my long, dreary adventures, when I lived a Robinson Crusoe life, marooned without even a good man Friday to comfort me!

For ten and a half years I remained there, waiting hopefully for the sail which I never sighted; while the constant labor required to accumulate the bare necessities of a livelihood was all that kept me from going insane.

In the end, I was taken with a severe fever, which overpowered me for many weeks; and my rotting bones would probably be lying to-day on Forlorn Reef had not the private yacht of John Morganfeld, Jr., cruising the South Pacific in search of spots unvisited by civilization, chanced to catch sight of my island and to observe the flag of dried palm leaves which waved from the highest hilltop as a signal to passing vessels.

When Morganfeld's men stepped ashore, I was in such an advanced stage of delirium that I could scarcely distinguish them from the creatures of my dreams; and all during the first weeks of the return voyage, when I lay abed in a little cabin, constantly attended by the ship's physician, I was hardly capable of realizing or caring what had happened.

Only when we had crossed as far as the coast of Chili, and were turning northward to pass through the canal and back to New York, did I regain any measure of my strength. Then, wrapped in blankets, I would sit on a sheltered part of the deck, gradually convalescing, while Morganfeld and his companions gathered about to hear snatches of my story, which never ceased to interest them.

Naturally, I was overjoyed at the thought that I was on my way back home; and, naturally, I was anxious to

hear reports from that great world which I had left as utterly as though I had flown to the moon

But my questions, strangely enough, never elicited any satisfactory response. My rescuers would look at me strangely when I asked about things at home, would exchange significant glances, as if to say, "How can we change the subject?" Then they would reply in a vague way that left me profoundly dissatisfied.

"Oh, don't trouble yourself, Dr. Ridings," one of the men would say. "Everything's all right—only different. You'll see for yourself."

"Yes, you'll see for yourself," another would chime in. "But just now you mustn't worry about such things, Dr. Ridings. You need all your energy to get well."

Plead as I would, I could not evoke any more enlightening response. The men avoided all direct questions; and fearing to exhaust my meager energies, I was forced on each occasion to drop the subject. But my suspicions were aroused—with what justification I was soon to learn.

We had already passed Panama, and were peacefully gliding through the blue Caribbean, when I caught a fragment of conversation that aroused my curiosity to fever pitch.

"Do you think we ought to tell him?" Morganfeld was inquiring of the captain, while I stood hidden from view behind one of the ventilating funnels "You know, it will be quite a shock——"

"Not so much of a shock as to let him know now!" interrupted the booming voice of the captain. "Remember what the doctor said!"

"Yes, that it would set back his recovery! Well, poor devil—guess he's suffered enough already. Besides, how could we explain? We'd only worry him to death!"

"Believe me, it'll be like Rip Van Winkle coming back from his long sleep!" thundered the captain, with a merry roar. "All I want is a glimpse of his face—when he finds out."

There were some other words, exchanged in tones of ringing laughter; but the men were withdrawing aft, and I could not make out the rest of their conversation.

It was with the most eager impatience, an impatience not unmixed with foreboding, that I now awaited our arrival in New York. Had I suspected what was to confront me upon reaching port, I would have been less anxious for the voyage to end.

IT WAS fortunate that my health was fully restored by the time we had reached New York; I was to need every spare ounce of my energy.

As we drew into the harbor in the cloudy dimness of a November morning, I was aware of a sudden tenseness, an excitement on board, men and women were dashing hither and thither in such a wild scramble that I could hardly recognize them, and at first I had a swift, startled impression that the ship was foundering. Yet, from time to time, my fellow voyagers would pause long enough to stare at me with queer, solicitous glances.

"Don't you think, old pal, you'd better let us take care of you when you arrive?" they would ask, one after another, with an insistency that angered me. Was I then such an invalid as to be unable to care for myself?

"I'll do very well without your aid, thank you," I would return, stiffly, and they went bustling about their way again. I did, however, go so far as to borrow a few dollars from Morganfeld; for I did not want to be without car fare. And thus equipped, but unencumbered by any baggage, I was ready to set forth upon the streets of that city which I had not visited for so many years.

Thanks to the intervention of Morganfeld, who personally vouched for me

to the inspectors, I had little difficulty in being readmitted to my native land even though, of course, I had no passport. And the morning was not half over when I had bidden my rescuer and the members of his party good-by, had thanked them all for their kindness, had slipped away from them though they sought to detain me, and found myself alone upon the long, gray dock, where hundreds of suitcases and trunks were being flung open for customs inspection.

Alone, and yet not alone! Never had I been in the midst of so tumultuous a crowd! For a moment, after descending from the gangplank, I blinked and rubbed my eyes, wondering if the fever had not seized me again. Certainly, no vision of delirium ever showed a madder spectacle than this frenzied multitude on the dock!

It was as if all were actors on a screen, and as if the film were being reeled off at three times the normal rate; every one was dashing about at such maniacal speed that it was difficult for my unadjusted eyes to follow their movements. Back and forth, back and forth, up and down, hither and thither the people rushed, whirling and pirouetting like tops, darting toward me in zigzag streaks and away with equal haste, some of them hopping about on one foot like animated toys, others flying around in circles like dogs in pursuit of their own tails, still others shooting past in straight lines like marathon racers, while occasionally colliding with other passers-by or even with a pillar or wall!

Reeling like a man intoxicated, I leaned against a post for support, and stared in a daze at that dizzy spectacle. Every one, it seemed to me, was moving with the speed of a cross-country runner; and no one—no one except myself—was able to remain still for as much as a second. Even the customs inspectors, when examining the contents of opened trunks, did so while on the run, rushing about in little circles as if their feet refused to remain inactive; even the porters, though each was laden with half a dozen valises, went tripping about the dock at acrobatic speed. I caught sight of a policeman who, instead of remaining sedately at his post of duty, flung himself backward and forward as though in frantic quest of a fugitive; I saw several frail-looking old ladies who, just arriving at the dock, ran forward with the romping haste of schoolgirls and were greeted by an old gentleman of even greater agility; I had a glimpse of a portly man who, though he waddled from excess weight, did so with a gymnastic quickness of movement; I observed several children gamboling back and forth with such velocity that I had hardly had time to blink before they had passed in a gray blur.

Only the dogs seemed human; one or two forlorn-looking hounds, moping at a corner of the dock, were staring at the agitated spectacle with a most seemly composure, as if secretly mourning the ruin of a universe.

One thing seemed certain to me as I stood there shuddering against my post—either the whole world was out of its head, or I was out of mine. Gloomily I came to the conclusion that I was suffering from some form of delirium tremens, due to my long illness—but surely, I thought, the nightmare would soon pass, leaving me normal again.

With this hope in mind, I began to make my way diffidently toward the street. Yet, though the distance was scarcely more than a hundred yards, I found myself launched upon a veritable pilgrimage of horrors. At every step I feared to be struck and knocked off my feet by some member of the rushing mob; at every step some one pushed or shoved me roughly out of the way. "Hurry up, you snail! You're blocking traffic!" I heard impatient voices crying, as I strove my best to keep up with the breathless pace of the crowd. But

a pedestrian might as well try to outrun a motor car! It was with trampled feet, bruised and aching sides, and a mind more bewildered than ever, that I at last found myself on the pavement.

AND even then there was no relief. Along the sidewalks, across the street, and everywhere in sight, men and women were dashing with the same crazy speed as on the docks. Taxicabs would draw up to the curb, and not only the passengers but the drivers would instantly leap out, and begin whirling and twisting about on one toe if they did not go circling away like a tornado. Trucks would arrive for unloading, and the workmen would leap back and forth at such an uncanny rate that they reminded me of springs unwinding; sedate-looking men and women—professors and ministers and the like—would come plunging toward me and away in such mad abandon that I prayed fervently for the nightmare to end.

I do not know through what effort of will I was eventually able to hail a taxicab and induce the driver to remain stationary long enough to permit me to enter. But, at all events, I did manage to gain this haven, and settling down for a few minutes of composure, called out the name of a well-known hotel—which, I was glad to find, was evidently still in existence, for the driver nodded knowingly, and then set off as if trying to break all speed records.

Traffic rules, apparently, had been suspended; he stopped neither for red lights nor for green, but went lunging at breakneck speed through avenues and alleys and around corners, narrowly averting so many collisions that only the bearer of a charmed life, I thought, could survive. As we tossed and rattled on our way, I caught glimpses of streets where sheer insanity ruled—every one was even more in a rush than the multitudes on the dock. Why, oh, why could I not shake myself out of my delirium?

It was the same at the hotel, which I reached in a state near to nervous exhaustion. The clerk twisted back and forth on one leg and did a whirling performance even while I was registering; the bell hop seemed to be suffering from St. Vitus' dance; the elevator boy found the floor of the car too small for his pirouetting maneuvers.

And as I hastened toward my room on the twenty-first floor, I had a head-on collision with a chambermaid, who came bounding out of a door, mop in hand, with the speed of an antelope, and hastened away without so much as an apology while I dolefully picked up my bruised remains from the corridor floor.

For the next hour of two I lay, fully dressed, upon the hotel bed, in a state near to prostration, while vainly my mind viewed and reviewed the events since my arrival in town. Try as I would, I could not make sense or order out of any of my experiences; hence questions as to my own sanity constantly recurred, even though I had never heard of any other sufferer from my own particular type of mental aberration.

But if I were not mad already, I would, unquestionably, have gone mad had I not done something to relieve the suspense.

Leaping to my feet at last, I rushed to the telephone, and, after hastily glancing through the directory, dialed the number of an old friend who, thank goodness, was still living at his former address.

It was only a few seconds until, to my great joy, I heard a familiar voice at the other end of the line. Or was it familiar? There was something in it that I seemed to recognize, but also something oddly unrecognizable.

"Well, well, who is it?" demanded the voice, in tones so rapid that I could hardly follow them.

"It is I—Ridings—Bill Ridings," I returned, taking care to enunciate clearly.

"What's that? Don't speak so slow! I can't hear you!" snapped the voice.

"It's I—Ridings—Bill Ridings! Dr. Ridings!" I repeated, more hastily.

"Can't make you out! What's holding back your tongue? Guess you've got the wrong number!" rattled the other party, with the same rush of words as before. And, to my disgust, I heard his receiver click back into place.

Trying not to let myself be too dismayed, I called another friend—but with even more disconcerting results. This time my old comrade—there was something in his tones which clearly showed it was he—addressed me in such a torrent of words that he might have been speaking Sanskrit, for all the information he conveyed. He, too, evidently found my own speech too slow to follow, and accordingly ended by cutting me off before I could explain who I was.

After a third and still more disheartening attempt, I gave up the effort, and hesitantly left the room and made my way down to the lobby, where I sought to engage the clerk in conversation, in the hope of gaining some light on the mystery.

But the only result was to deepen the darkness. Never pausing in his movements as he hopped about on one foot behind the railing, the clerk looked at me queerly when I addressed him.

"Talk faster, can't you?" he demanded, though I had never been known as particularly slow of speech; and when I repeated my question, in such haste as almost to take my breath away, and asked what it was that had overtaken the world, he looked at me more queerly than ever, and then launched forth upon a flow of words so rapid that one would have thought he was trying for a record.

Alas! I could not begin to follow him! Now and then I could make out a word—that was all! His speech gave the impression of a phonographic talk running at several times the natural rate! My ears were not accustomed to take in the sound vibrations at such speed!

REALIZING that no enlightenment was possible from this source, I mumbled my thanks, and went off into the street. But I was afraid to go very far. Pedestrians were darting about on the sidewalks with such velocity that I felt my life to be imperiled. However, by hugging the walls of the buildings, I did manage to go as far as the nearest street corner without mishap, and then was led by curiosity to enter a large department store, where the fever and excitement surpassed anything I had yet seen.

Down the main aisles the floorwalkers —or shall I say, floor runners?—were skimming with a whizzing force, threading their way among crowds of women shoppers, all of whom were flitting back and forth, back and forth, examining goods and making purchases with such speed that my eyes could barely follow their movements; while the salesgirls, twisting and turning like wound tops behind the counters, made me dizzy merely to look at them as they rushed the boxes or merchandise back and forth from the shelves and did swift circles with their hands about the packages which they tied.

Growing more interested in spite of myself, I roamed through several departments, until at length I found myself on the mezzanine floor, where a score of patrons were taking refreshments in a tea room. Here, as everywhere, an inordinate rush prevailed; the waiters literally ran about the room, balancing trays with one hand until I marveled at their acrobatics; while the customers ate as rapidly as they did everything else, stuffing great wads of toast down their throats and swallowing whole cups of boiling coffee in less time than it would take to flick one's fingers.

Feeling a trifle weak and faint, I was just about to sit down for a little repast

when I was overtaken by that disaster which I had dreaded from the moment I had set foot on the dock.

To this day, I do not know just what it was that struck me—whether a fat woman, in her haste, had fallen over me, or a waiter, in his impetuous rush, had knocked me off my feet—though probably it was the latter, for I seemed to hear the crash and rattling of broken crockery as something huge and irresistible dealt me a thudding blow from behind. I was aware that I had lost my balance and was pitching to the floor; there was a deadening, sickly sensation in my head, and the world seemed to be whirling round about me; then, with merciful swiftness, I was overcome by vertigo, and all things were blotted from my view

When I awoke, there was a dazed sensation in my head, which was swathed in bandages; and I knew that I was lying in bed, in an unfamiliar room. For a moment, I had the impression that I was back at sea, on Morganfeld's yacht, just beginning to convalesce after my rescue from Forlorn Reef; and at first I experienced a delirious swaying sensation, as from the motion of a ship But after a minute or two, as my mind gradually cleared, I recognized that the swaying was in my own imagination, a product of my weakness. I lay in a large, white-walled room containing many cots in long, monotonously even rows, and pungent with unpleasant, familiar odors How vividly now I was brought back to my years of medical practice, when I had visited hospital wards not as a patient but as a physician!

I had not had my eyes open for many minutes, however, before I discovered that this ward was strangely, subtly different from any I had ever seen before. It was not in its appearance, or in the number or arrangement of the beds that it was unusual; it was in the manners and methods of the attendants.

Even here, in the precincts of sickness, men dashed back and forth with that wild, uncontrollable haste which had seized the world like an obsession! What was my astonishment when the nurses and physicians rushed in and out as though the place were afire, and administered medicines and felt pulses with such speed that I had hardly time to blink before they were done! And what was my consternation to see a pair of stretcher bearers come in at a gallop, and deposit a new patient on a couch as though trying for a speed record!

Worst of all, how indignant I was at my personal treatment! When the nurses examined and replaced my bandages, they moved so frantically as to leave me aching for hours And when they brought my food, they disregarded every law of decency, common sense and health; for if I set about to consume my food in the leisurely manner of one who has nothing else to do, I would as often as not find that the meal had disappeared before I had had time to eat it! Such was the disgusting efficiency of these attendants that they would snatch the morsels from before my very eyes, on the assumption that since I ate so slowly I did not wish to eat at all!

To make matters still more annoying, it was impossible to argue or protest. Try as I would, I spoke at such a slow pace that they lacked either the will or the ability to follow me; while I, in turn, was rarely able to make much sense of their headlong torrents of words.

Even my fellow patients, as I learned to my despair, seemed afflicted with the general mania. When I addressed them, they replied with the same mystifying haste as every one else; and it was not long before I gave up the effort, for their tongues moved as if they and I spoke different languages.

Had it not been for the fortunate arrival of a new patient in the cot to my right, I should probably have re-

manned without any one to speak to—and might never have penetrated the secrets that were bewildering me.

IT WAS on my third day in the hospital that a slim, long-haired individual, with intense deep-blue eyes and a pathetic expression, became my neighbor in misfortune. He was about twenty-six or twenty-seven years of age, and had a most ingratiating expression, particularly when he smiled his frank, free smile; and I was, therefore, grieved to see that his chest and arms were in bandages, as though from a serious accident

"Holy mackerel! Can't you treat a man like a man? Think I'm a bar of lead?" I heard him swearing, after the stretcher bearers had thrown him upon his cot and made their precipitate departure.

Distressed as I was at the young man's misfortune, these words made my heart leap with joy. Here was a man who spoke at a rate I could understand! Perhaps, unlike every one else, he was not a speed maniac!

Such, in fact, proved to be the case! I engaged him in conversation, and found to my delight that he spoke quite normally! What was more, he seemed overjoyed at my own slow speech. "Well, whoever you are," he exclaimed with fervor, "I'm glad to hear a real man once more! Every one else sounds like a wound machine!"

"Let me introduce myself," said I, foreseeing that the young man and I were to strike up a warm friendship. "My name is Dr. William Lee Ridings."

"And mine," said he, "is George O'Hara Kay. I may refer to myself as the sole surviving member of an otherwise extinct species."

"Otherwise extinct species?"

"Yes. To admit the dismal truth—I'm a poet."

"I should think that would make your species overabundant."

The young man sighed. "Quite the contrary! You talk as if you've forgotten the events of the last ten years. Why, there hasn't been time for poets, ever since the world went triple-geared and——"

"Triple-geared?" I interrupted, puzzled. "I knew that something serious was wrong, but—er—well, to tell the truth——"

It was now Mr. Kay's turn to look puzzled. "Come now! Come!" he protested, with an offended expression in his deep, clear-blue eyes. "Don't pretend you're ignorant of the greatest social change since man came down from the trees!"

"Well, er—er—the fact is," I faltered, wondering how best to break the news, "I really am quite ignorant of it all. The fact is that I—er—I've passed nearly eleven years on a desert island"

"Desert island?" An ecstatic flash came into the poet's eyes; he quivered, as though with joy, and a long-drawn sigh came from between his lips. "Desert island! Why, how splendid! How ideal! But what evil fate could have brought you to leave it?"

"That's what I'm beginning to wonder," I confessed.

"Oh, for a desert island! A desert island all my own!" he murmured, with a vaguely humorous and yet unutterably wistful expression on his long, drawn face. "You know, that's what I craved all these years, when I defied the government and refused to be triple-geared! As a poet, I couldn't permit triple-gearing—even though every one did call me a slacker, a mad radical, and a traitor to progress! But how I've suffered for my rebellion—oh, how I've suffered!"

All this was quite meaningless to me, and I did not hesitate to say so. "What's all this you're saying about being triple-geared?" I demanded. "And what is it, anyhow, that's overcome this whole frantic world?"

"Frantic world is right!" Kay ejacu-

lated, with a droll expression. "If it wasn't quite so frantic, I wouldn't have been bowled over to-day by a man running to enter a subway door just after it closed—and wouldn't be taking a vacation here in the hospital. But I see, Dr. Ridings, you're as ignorant as a new-born babe. So I'll try to explain a little of what's happened—though an encyclopedia wouldn't be big enough for it all."

The poet turned a little on his cot, put one hand to his bandages as though they were paining him, and, after a moment, launched forth upon that recital which I had been so eagerly awaiting:

"IT WAS way back in '51 that the trouble began. Sometime in the spring of that year a bombshell was sprung on the world, in the announcement of Professor J. Cramer Fells, the famous physiologist, that he had just completed a series of important investigations on the human nervous system—in fact, he had discovered a drug which would transform our whole psychic attunement, our whole life mechanism. This drug, which has a long technical name but is popularly known as 'Speedo,' has the effect of changing the human time sense and accelerating all the physical and mental processes; of enlarging each moment until it seems as long as three—in other words, of putting a man in triple-gear, and enabling him to do as much each second as he could formerly do in three——"

"But how is that possible?" I interrupted. "Surely, there is such a fundamental reality as time——"

Kay stared at me with just a little scorn in his expressive blue eyes.

"Certainly not!" he asserted. "If there is anything modern science has proved, it is the essentially unreal, illusory quality of time as we perceive it. Why, Einstein and others demonstrated that long ago. Besides, we know it from our own experience—a dream that seems infinitely prolonged may last but an instant. Again, certain drugs such as hasheesh have long been known to alter a man's time perceptions."

"True! Very true!" I admitted, meditatively, beginning to see Kay's point of view. "Certain other animals—possibly birds, and undoubtedly insects—appear to have a different time perception from ours, as any one may judge from the number and complexity of their motions in a single second."

"Exactly! Well now, to come down to Professor Fells' invention. I'm not enough of a scientist to remember the formula, though I know it contains morphine, belladonna, and half a dozen other substances. At any rate, it acts on the nerves to produce triple-gearing. Since one hour under the action of the drug seems as long as three, as many things can be accomplished as formerly in three; and the drug taker, all the time, will believe he is acting at his usual pace. Economists recommend it as the best method ever devised for efficiency in labor."

"But don't the effects of this—of this Speedo wear off?" I demanded. "And doesn't it produce any harmful results?"

Kay twisted slightly on his cot, and uttered an involuntary groan;

"The effects last a month—then a new dose must be taken. The drug is, unfortunately, most inexpensive. As for the ill effects—there has been much difference of opinion, though statisticians claim the death rate has gone up. However, it's hard to say, since the Speedo manufacturers have spent millions to keep the facts secret. This much, at least, is certain: The whole country has gone wild over the drug. And not only this country—every civilized land! It took quite a while before it really made headway, but in the last three or four years it has taken everything by storm. To-day the man

who doesn't take Speedo is as rare as a horse and carriage on Fifth Avenue"

"Well, in any case, you're not compelled by law to take it, are you?" I questioned.

"No—not quite that bad!" The poet paused long enough for a deep, disconsolate sigh. "Not quite that bad—but almost! There's a sort of unwritten law—if you don't use it you're considered as far out of date as the Diplodocus. You're unfit to associate in society; you're unfit to take a job—in fact, it's only once in a blue moon you can even find some one to talk to. With me it's been a matter of poetic principle to refrain from Speedo—but, believe me, I've been more lonely than if I'd lived on your desert isle!"

"Why didn't you try to reach some saner environment?"

"Saner environment? Haven't I prayed to? But where is there a saner environment? I tell you, friend, it doesn't matter if you're in the city or country—everybody you meet has this same damned triple-gearing!"

On the basis of my own experience, this seemed to be an overstatement in at least one respect.

"Come now, surely you exaggerate," I remonstrated. "The people I met on Morganfeld's yacht were single-geared, just like you and me. At any rate, until we were nearing port."

"That's because triple-geared time would be so monotonously long at sea," explained the poet. "Generally speaking, sea travelers don't take Speedo until they're getting back to land."

One mystery, at all events, was now solved—why my rescuers had moved at a normal pace when I first saw them, and why they had begun dashing about with such excited haste as the ship approached the docks.

"If I could have gotten to sea, even as a cabin boy, believe me I'd have done so!" swore my new friend, mournfully. "But who would have a poet—particularly a poet who wasn't triple-geared? For three years I've been down and out. Why, I haven't so much as looked a good meal in the face. And as for paying garret rent—if it hadn't been for the dole——"

But here my friend broke short, and turned abruptly from me, as if to hide his emotion.

"Poor fellow!" I sympathized. "So you think there's no chance of the world's doing away with triple-gearing?"

"Not a chance! No earthly chance!" he lamented. "You should hear how every one praises it. Why, they're always boasting of the advantage to business—three transactions in the time it used to take for one! And then the gain in warfare—three campaigns fought, three battleships sunk, three cities demolished as fast as one in the old times! No, no, Dr. Ridings, I'm afraid triple-gearing has come to stay!"

A long gloomy silence intervened. All too clearly I perceived the truthfulness of Kay's statements.

"Come on, old chap," I said at last, with a sense of hopeless resignation. "Might as well make the best of a bad bargain! Since every one else has gone triple-geared, there's nothing for us to do but follow. Maybe it won't be so bad, once we try it!"

"Well, maybe not, maybe not!" admitted the poet, reluctantly. "I've often been at the point, but never could quite summon up the courage. Somehow, I've always felt Speedo was not for me!"

"Let's both try it together, as soon as we get out of this place," I suggested. And though the poet protested and argued, my reasoning proved too much for him; finally, after several hours' dispute, we both agreed to what seemed the inevitable——

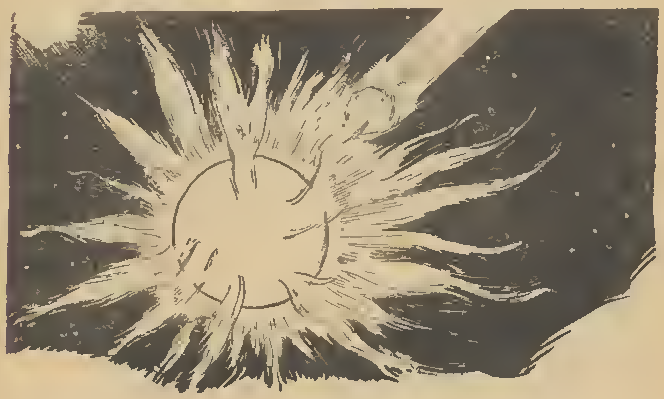
I must confess that a sense of elation came to me as we reached this decision. After all, I thought, life might be exceedingly interesting, if one were triple-geared like everybody else!

ELEVEN months have passed since we left the hospital As I write these words, I sit opposite the poet on the deck of a south-bound steamer. It is unlikely that either of us will ever again see the land we are leaving, for we are more hopelessly out of tune with the world than ever. Alas! our triple-gearing has worked only too well! I do not know why! Perhaps our resistance to the drug has heightened its activity! At all events, Speedo has set us both off at twice triple-gear! It has keyed us up to six times normal speed, making us dash around twice as fast as any one else, so that mere triple-geared mortals have struck us as slower than sloths!

Nothing we could do had any effect; ten times we have allowed the influence of Speedo to wear off, and ten times have swallowed another dose, but always with the same results! Invariably we have gone up to six times the normal tempo! We have become too fast to speak, work or live with any other human being!

Under these conditions, life in the civilized world is still impossible for us. Hence, drawing my savings of years from the bank, I have done the only thing left. I have purchased a passage for two to Forlorn Reef, along with all necessary equipment.

We are looking forward to the island with pleasant anticipations; for, desolate as it may appear, we are convinced that life there with but one companion will be better than a six-geared existence in a world more sluggish than a coach horse, or than a single-geared career amid the hum and rush of incurable speed maniacs.



THE LOTUS EATERS

Another story by a new master of science-fiction. This has to do with strange, unrighteous dwellers of the dark. An exploration of new corners of the planet Venus.

by STANLEY G. WEINBAUM

WHEW!" whistled "Ham" Hammond, staring through the right forward observation port. "What a place for a honeymoon!"

"Then you shouldn't have married a biologist," remarked Mrs. Hammond over his shoulder, but he could see her gray eyes dancing in the glass of the port. "Nor an explorer's daugbter," she added. For Pat Hammond, until her marriage to Ham a scant four weeks ago, had been Patricia Burlingame, daughter of the great Englishman who had won so much of the twilight zone of Venus for Britain, exactly as Crowley had done for the United States.

"I didn't," observed Ham, "marry a biologist. I married a girl who happened to be interested in biology; that's all. It's one of her few drawbacks."

He cut the blast to the underjets, and the rocket settled down on a cushion of flame toward the black landscape below. Slowly, carefully, he dropped the unwieldy mechanism until there was the faintest perceptible jar; then he killed the blast suddenly, the floor beneath them tilted slightly, and a strange silence fell like a blanket after the cessation of the roaring blast.

"We're here," he announced.

"So we are," agreed Pat. "Where's here?"

"It's a point exactly seventy-five miles east of the Barrier opposite Venoble, in the British Cool Country. To the north is, I suppose, the continuation of the Mountains of Eternity, and to the south is Heaven knows what. And this last applies to the east."

"Which is a good tecbnical description of nowhere." Pat laughed. "Let's turn off the lights and look at nowhere"

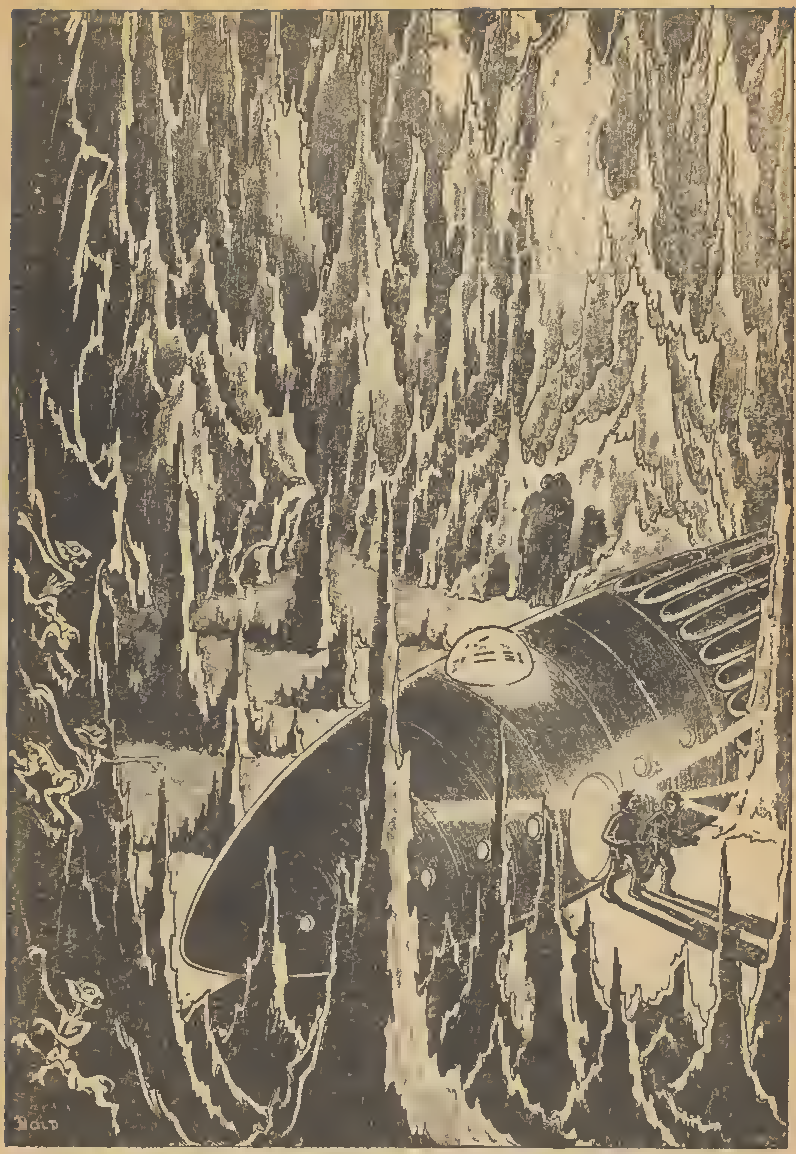
She did, and in the darkness the ports showed as faintly luminous circles.

"I suggest," sbe proceeded, "that the Joint Expedition ascend to the dome for a less restricted view. We're here to investigate; let's do a little investigating."

"This joint of the expedition agrees," chuckled Ham.

He grinned in the darkness at the flippancy with which Pat approached the serious business of exploration. Here they were, the Joint Expedition of the Royal Society and the Smithsonian Institute for the Investigation of Conditions on the Dark Side of Venus, to use the full official title.

Of course Ham himself, while technically the American half of the project, was in reality a member only because Pat wouldn't consider anything else; but she was the one to whom the bearded society and institute members



The two wandered exploringly about the uneven plain. The Underwind swept about them. Strange things scampered off at their approach.

addressed their questions, their terms, and their instructions.

And this was no more than fair, for Pat, after all, was the leading authority on Hotland flora and fauna, and, moreover, the first human child born on Venus, while Ham was only an engineer lured originally to the Venusian frontier by a dream of quick wealth in *xixtchil* trading in the Hotlands.

It was there he had met Patricia Burlingame, and there, after an adventurous journey to the foothills of the Mountains of Eternity, that he had won her. They had been married in Erotia, the American settlement, less than a month ago, and then had come the offer of the expedition to the dark side.

Ham had argued against it. He wanted a good terrestrial honeymoon in New York or London, but there were difficulties. Primarily there was the astronomical one; Venus was past perigee, and it would be eight long months before its slow swing around the Sun brought it back to a point where a rocket could overtake the Earth.

Eight months in primitive, frontier-built Erotia, or in equally primitive Venoble, if they chose the British settlement, with no amusement save hunting, no radio, no plays, even very few books. And if they must hunt, Pat argued, why not add the thrill and danger of the unknown?

No one knew what life, if any, lurked on the dark side of the planet; very few had even seen it, and those few from rockets speeding over vast mountain ranges or infinite frozen oceans. Here was a chance to explain the mystery, and explore it expenses paid.

It took a multimillionaire to build and equip a private rocket, but the Royal Society and the Smithsonian Institute, spending government money, were above such considerations. There'd be danger, perhaps, and breath-taking thrills, and, more than all, they could be alone.

THE LAST point had won Ham. So they had spent two busy weeks provisioning and equipping the rocket, had soared gloriously away from Venoble, had ridden high above the ice barrier that bounds the twilight zone, and dashed frantically through the storm line, where the cold Underwind from the sunless side meets the hot Upper Winds that sweep from the desert face of the planet.

For Venus, of course, has no rotation, and hence no alternate days and nights. One face is forever sunlit, and one forever dark, and only the planet's slow libration gives the twilight zone a semblance of seasons. And this twilight zone, the only habitable part of the planet, merges through the Hotlands on one side to the blazing desert face, and on the other side ends abruptly in the ice barrier where the Upper Winds yield their moisture to the chilling breath of the Underwind.

So here they were, crowded into the tiny glass dome above the navigation panel, standing close together on the top rung of the ladder, and with just room in the dome for both their heads. Ham slipped his arm around the girl as they stared at the scene outside.

Away off to the west was the eternal dawn, or sunset, perhaps, where the light glistened on the ice barrier. Like vast columns, the Mountains of Eternity thrust themselves against the light, with their mighty peaks lost in the lower clouds twenty-five miles above. There, a little south, were the ramparts of the Lesser Eternities, bounding American Venus, and between the two ranges were the perpetual lightnings of the storm line.

But around them, illuminated dimly by the refraction of the sunlight, was a scene of dark and wild splendor. Everywhere was ice—hills of it, spires,

plains, boulders, and cliffs of it, all glowing a pallid green in the trickle of light from beyond the barrier. A world without motion, frozen and sterile, save for the moaning of the Underwind outside, not hindered here as the barrier shielded it from the Cool Country.

"It's—glorious!" Pat murmured.

"Yes," he argued; "but cold, lifeless, yet menacing. Pat, do you think there *is* life here?"

"I should judge so. If life can exist on such planets as Titan and Iapetus, it should exist here. How cold is it?" She glanced at the thermometer outside the dome, its column and figures self-luminous. "Only thirty below zero, Fahrenheit. Life exists on Earth at that temperature."

"Exists, yes. But it couldn't have developed at a temperature below freezing. Life has to be lived in liquid water."

She laughed softly. "You're talking to a biologist, Ham. No, life couldn't have *evolved* at thirty below zero, but suppose it originated back in the twilight zone and migrated here? Or suppose it was pushed here by the terrific competition of the warmer regions? *You* know what conditions are in the Hotlands, with the molds and doughpots and Jack Ketch trees, and the millions of little parasitic things, all eating each other. So competitive that the Amazon jungles on Earth are about as sterile as Greenland by comparison."

He considered this. "What sort of life should you expect?"

She chuckled. "Do you want a prediction? Very well. I'd guess, first of all, some sort of vegetation as a base, for animal life can't keep eating itself without some added fuel. It's like the story of the man with the cat farm, who raised rats to feed the cats, and then when he skinned the cats, he fed the bodies to the rats, and then fed more rats to the cats. It sounds good, but it won't work."

"So there ought to be vegetation. Then what?"

"Then? Heaven knows. Presumably the dark side life, if it exists, came originally from the weaker strains of twilight-zone life, but what it might have become—well, I can't guess. Of course, there's the *triops noctivivans* that I discovered in the Mountains of Eternity——"

"*You* discovered!" He grinned. "You were out as cold as ice when I carried you away from that nest of devils. You never even saw one!"

"I examined the dead one brought into Venoble by the hunters," she returned imperturbably. "And don't forget that the society wanted to name it after me—the *triops Patriciae*." Involuntarily a shudder shook her at the memory of those satanic creatures that had all but destroyed the two of them. "But I chose the other name—*triops noctivivans*, the three-eyed dweller in the dark."

"Romantic name for a devilish beast!"

"Yes; but what I was getting at is this—that it's probable that triops—or triopses—— Say, what is the plural of triops?"

"Trioptes," he grunted. "Latin root."

"Well, it's probable that trioptes, then, are among the creatures to be found here on the night side, and that those fierce devils who attacked us in that shadowed canyon in the Mountains of Eternity are an outpost, creeping into the twilight zone through the dark and sunless passes in the mountains. They can't stand light; you saw that yourself."

"So what?"

PAT laughed at the Americanism. "So this: From their form and structure—six limbs, three eyes, and all—it's plain that the trioptes are related to the ordinary native Hotlanders. Therefore I conclude that they're recent ar-

rivals on the dark side; that they didn't evolve here, but were driven here quite lately, geologically speaking. Or geologically isn't quite the word, because *geos* means earth. *Venusologically* speaking, I should say."

"You shouldn't say. You're substituting a Latin root for a Greek one. What you mean is aphrodisiologically speaking"

She chuckled again. "What I mean, and should have said right away to avoid argument, is palæontologically speaking, which is better English. Anyway, I mean that trioptes haven't existed on the dark side for more than twenty to fifty thousand Earth years, or maybe less, because what do we know about the speed of evolution on Venus? Perhaps it's faster than on the Earth; maybe a triops could adapt itself to night life in five thousand."

"I've seen college students adapt themselves to night life in one semester!" He grinned.

She ignored this. "And therefore," she proceeded, "I argue that there must have been life here before trioptes arrived, since it must have found something to eat when it got here or it couldn't have survived. And since my examination showed that it's partly a carnivorous feeder, there must have been not only life here, but animal life. And that's as far as pure reason can carry the argument"

"So you can't guess what sort of animal life. Intelligent, perhaps?"

"I don't know. It might be. But in spite of the way you Yankees worship intelligence, biologically it's unimportant. It hasn't even much survival value."

"What? How can you say that, Pat? What except human intelligence has given man the supremacy of the Earth —and of Venus, too, for that matter?"

"But *has* man the supremacy of the Earth? Look here, Ham, here's what I mean about intelligence. A gorilla has a far better brain than a turtle, hasn't it? And yet which is the more successful—the gorilla, which is rare and confined only to a small region in Africa, or the turtle, which is common everywhere from the arctic to the antarctic? And as for man—well, if you had microscopic eyes, and could see every living thing on the Earth, you'd decide that man was just a rare specimen, and that the planet was really a nematode world—that is, a worm world —because the nematodes far outnumber all the other forms of life put together."

"But that isn't supremacy, Pat."

"I didn't say it was. I merely said that intelligence hasn't much survival value. If it has, why are the insects, that have no intelligence, but just instinct, giving the human race such a battle? Men have better brains than corn borers, boll weevils, fruit flies, Japanese beetles, gypsy moths, and all the other pests, and yet they match our intelligence with just one weapon—their enormous fecundity. Do you realize that every time a child is born, until it's balanced by a death, it can be fed in only one way? And that way is by taking the food away from the child's own weight of insects."

"All that sounds reasonable enough, but what's it got to do with intelligence on the dark side of Venus?"

"I don't know," replied Pat, and her voice took on a queer tinge of nervousness. "I just mean—— Look at it this way, Ham. A lizard is more intelligent than a fish, but not enough more to give it any advantage. Then *why* did the lizard and its descendants keep on developing intelligence? Why—unless all life tends to become intelligent in time? And if that's true, then there may be intelligence even here—strange, alien, incomprehensible intelligence"

She shivered in the dark against him. "Never mind," she said in suddenly altered tones. "It's probably just fancy. The world out there is so weird, so

unearthly—— I'm tired, Ham. It's been a long day."

He followed her down into the body of the rocket. As the lights flicked on the strange landscape beyond the ports was blotted out, and he saw only Pat, very lovely in the scanty costume of the Cool Country.

"To-morrow, then," he said. "We've food for three weeks."

II.

TO-MORROW, of course, meant only time and not daylight. They rose to the same darkness that had always blanketed the sunless half of Venus, with the same eternal sunset green on the horizon at the barrier. But Pat was in better humor, and went eagerly about the preparations for their first venture into the open. She brought out the parkas of inch-thick wool sheathed in rubber, and Ham, in his capacity as engineer, carefully inspected the hoods, each with its crown of four powerful lamps.

These were primarily for vision, of course, but they had another purpose. It was known that the incredibly fierce trioptes could not face light, and thus, by using all four beams in the helmet, one could move, surrounded by a protective aura. But that did not prevent both of them from including in their equipment two blunt blue automatics and a pair of the terrifically destructive flame pistols. And Pat carried a bag at her belt, into which she proposed to drop specimens of any dark-side flora she encountered, and fauna, too, if it proved small and harmless enough.

They grinned at each other through their masks.

"Makes you look fat," observed Ham maliciously, and enjoyed her sniff of anger.

She turned, threw open the door, and stamped into the open.

It was different from looking out through a port. Then the scene had some of the unreality and all of the immobility and silence of a picture, but now it was actually around them, and the cold breath and mournful voice of the Underwind proved definitely enough that the world was real. For a moment they stood in the circlet of light from the rocket ports, staring awe-struck at the horizon where the unbelievable peaks of the Greater Eternities towered black against the false sunset.

Nearer, for as far as vision reached through that sunless, moonless, starless region, was a desolate tumbled plain where peaks, minarets, spires, and ridges of ice and stone rose in indescribable and fantastic shapes, carved by the wild artistry of the Underwind.

Ham slipped a padded arm around Pat, and was surprised to feel her shiver. "Cold?" he asked, glancing at the dial thermometer on his wrist. "It's only thirty-six below."

"I'm not cold," replied Pat. "It's the scenery; that's all." She moved away. "I wonder what keeps the place as warm as it is. Without sunlight you'd think——"

"Then you'd be wrong," cut in Ham. "Any engineer knows that gases diffuse. The Upper Winds are going by just five or six miles over our heads, and they naturally carry a lot of heat from the desert beyond the twilight zone. There's some diffusion of the warm air into the cold, and then, besides, as the warm winds cool, they tend to sink. And what's more, the contour of the country has a lot to do with it."

He paused. "Say," he went on reflectively, "I shouldn't be surprised if we found sections near the Eternities where there was a down draft, where the Upper Winds slid right along the slope and gave certain places a fairly bearable climate."

He followed Pat as she poked round

the boulders near the edge of the circle of light from the rocket.

"Ha!" she exclaimed. "There it is, Ham! There's our specimen of dark-side plant life."

She bent over a gray bulbous mass. "Lichenous or fungoid," she continued. "No leaves, of course; leaves are only useful in sunlight. No chlorophyl for the same reason. A very primitive, very simple plant, and yet—in some ways—not simple at all. Look, Ham—a highly developed circulatory system!"

He leaned closer, and in the dim yellow light from the ports he saw the fine tracery of veins she indicated.

"That," she proceeded, "would indicate a sort of heart and—I wonder!" Abruptly she thrust her dial thermometer against the fleshy mass, held it there a moment, and then peered at it. "Yes! Look how the needle's moved, Ham It's warm! A warm-blooded plant. And when you think of it, it's only natural, because that's the one sort of plant that could live in a region forever below freezing. Life *must* be lived in liquid water."

She tugged at the thing, and with a sullen plump it came free, and dark driblets of liquid welled out of the torn root.

"Ugh!" exclaimed Ham. "What a disgusting thing! 'And tore the bleeding mandragore,' eh? Only they were supposed to scream when you uprooted them."

He paused. A low, pulsing, wailing whimper came out of the quivering mass of pulp, and he turned a startled gaze on Pat "Ugh!" he grunted again. "Disgusting!"

"Disgusting? Why, it's a beautiful organism! It's adapted perfectly to its environment."

"Well, I'm glad I'm an engineer," he growled, watching Pat as she opened the rocket's door and laid the thing on a square of rubber within. "Come on. Let's look around."

PAT closed the door and followed him away from the rocket. Instantly the night folded in around them like a black mist, and it was only by glancing back at the lighted ports that Pat could convince herself that they stood actually in a real world.

"Should we light our helmet lamps?" asked Ham "We'd better, I suppose, or risk a fall."

Before either could move farther, a sound struck through the moaning of the Underwind, a wild, fierce, unearthly shrieking like laughter in hell, hoots and howls and mirthless chuckling noises.

"It's triopts!" gasped Pat, forgetting plurals and grammar alike.

She was frightened; ordinarily she was as courageous as Ham, and rather more reckless and daring, but those uncanny shrieks brought back the moments of torment when they had been trapped in the canyon in the Mountains of Eternity. She was badly frightened, and fumbled frantically at light switch and revolver, and ineffectually at both.

Just as half a dozen stones hummed fast as bullets around them, and one crashed painfully on Ham's arm, he flicked oo his lights. Four beams shot in a long cross on the glittering peaks, and the wild laughter rose in a crescendo of pain He had a momentary glimpse of shadowy figures flinging themselves from pinnacle and ridge, flitting specterlike into the darkness, and then silence.

"O-o-oh!" murmured Pat. "I—was scared, Ham." She huddled against him, then continued more strongly: "But there's proof. *Triops nocturnans* actually is a night-side creature, and those in the mountains are outposts or fragments that've wandered into the sunless chasms."

Far off sounded the booting laughter. "I wonder," mused Ham, "if that noise of theirs is in the nature of a language."

"Very probably. After all, the Hotland natives are intelligent, and these creatures are a related species. Besides, they throw stones, and they knew the use of those smothering pods they showered on us in the canyon—which, by the way, must be the fruit of some night-side plant. The triopes are doubtless intelligent in a fierce, bloodthirsty, barbaric fashion, but the beasts are so unapproachable that I doubt if human beings ever learn much of their minds or language."

Ham agreed emphatically, the more so as a viciously cast rock suddenly chipped glittering particles from an icy spire a dozen paces away. He twisted his head, sending the beams of his helmet lamps angling over the plain, and a single shrill cachinnation drifted out of the dark.

"Thank Heaven the lights keep 'em fairly out of range," he muttered. "These are pleasant little subjects of his majesty,* aren't they? God save the king if he had many more like 'em!"

But Pat was again engaged in her search for specimens. She had switched on her lamps now, and scrambled agilely in and out among the fantastic monuments of that bizarre plain. Ham followed her, watching as she wrenched up bleeding and whimpering vegetation. She found a dozen varieties, and one little wriggling cigar-shaped creature that she gazed at in perplexity, quite unable to determine whether it was plant, animal, or neither. And at last her specimen bag was completely filled, and they turned back over the plain toward the rocket, whose ports gleamed afar like a row of staring eyes.

But a shock awaited them as they opened the door to enter. Both of them started back at the gust of warm, stuffy, putrid, and unbreathable air that gushed into their faces with an odor of carrion.

"What——" gasped Ham, and then laughed. "Your mandragore!" He chuckled. "Look at it!"

"Oh!" ejaculated Pat in disgust.

The plant she had placed within was a mass of decayed corruption. In the warmth of the interior it had decomposed rapidly and completely and was now but a semiliquid heap on the rubber mat. She pulled it through the entrance and flung mat and all away.

They clambered into an interior still reeking, and Ham set a ventilator spinning. The air that came in was cold, of course, but pure with the breath of the Underwind, sterile and dustless from its sweep across five thousand miles of frozen oceans and mountains. He swung the door closed, set a heater going, and dropped his visor to grin at Pat.

"So that's your beautiful organism!" he chuckled.

"It was. It *was* a beautiful organism, Ham. You can't blame it because we exposed it to temperatures it was never supposed to encounter." She sighed and slung her specimen pouch to the table. "I'll have to prepare these at once, I suppose, since they don't keep."

Ham grunted and set about the preparation of a meal, working with the expert touch of a true Hotlander. He glanced at Pat as she bent over her specimens, injecting the bichloride solution.

"Do you suppose," he asked, "that the triops is the highest form of life on the dark side?"

"Beyond doubt," replied Pat. "If any higher form existed, it would long ago have exterminated those fierce devils."

But she was utterly wrong.

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*They were on British territory, being in the latitude of Venoble. The International Congress at Lisle had in 2020 apportioned the dark-side rights by giving to each nation owning Venusian possessions a wedge extending from the twilight zone to a point on the planet directly opposite the Sun in mid-autumn.

III.

WITHIN the span of four days they had exhausted the possibilities of the tumbled plain around the rocket Pat had accumulated a variegated group of specimens, and Ham had taken an endless series of observations on temperature, on magnetic variations, on the direction and velocity of the Underwind.

So they moved their base, and the rocket flared into flight southward, toward the region where, presumably, the vast and mysterious Mountains of Eternity towered across the ice barrier into the dusky world of the night side. They flew slowly, throttling the reaction motors to a bare fifty miles an hour, for they were flying through night, depending on the beam of the forward light to warn against looming peaks.

Twice they halted, and each time a day or two sufficed to indicate that the region was similar to that of their first base. The same veined and bulbous plants, the same eternal Underwind, the same mocking laughter from bloodthirsty trioptic throats.

But on the third occasion, there was a difference. They came to rest on a wild and bleak plateau among the foothills of the Greater Eternities. Far away to the westward, half the horizon still glowed green with the false sunset, but the whole span south of the due-west point was black, hidden from view by the vast ramparts of the range that soared twenty-five miles above them into the black heavens. The mountains were invisible, of course, in that region of endless night, but the two in the rocket felt the colossal nearness of those incredible peaks.

And there was another way in which the mighty presence of the Mountains of Eternity affected them. The region was warm—not warm by the standards of the twilight zone, but much warmer than the plain below. Their thermometers showed zero on one side of the rocket, five above on the other. The vast peaks, ascending into the level of the Upper Winds, set up eddies and stray currents that brought warm air down to temper the cold breath of the Underwind.

Ham stared gloomily over the plateau visible in the lights. "I don't like it," he grunted. "I never did like these mountains, not since you made a fool of yourself by trying to cross 'em back in the Cool Country."

"A fool!" echoed Pat. "Who named these mountains? Who crossed them? Who discovered them? My father, that's who!"

"And so you thought you inherited 'em," he retorted, "and that all you had to do was to whistle and they'd lie down and play dead, and Madman's Pass would turn into a park walk. With the result that you'd now be a heap of clean-picked bones in a canyon if I hadn't been around to carry you out of it."

"Oh, you're just a timid Yankee!" she snapped. "I'm going outside to have a look." She pulled on her parka and stepped to the door, and there paused. "Aren't you—aren't you coming, too?" she asked hesitantly.

He grinned. "Sure! I just wanted to hear you ask." He slipped into his own outdoor garb and followed.

There was a difference here. Outwardly the plateau presented the same bleak wilderness of ice and stone that they had found on the plain below. There were wind-eroded pinnacles of the utmost fantasy of form, and the wild landscape that glittered in the beams from their helmet lamps was the same bizarre terrain that they had first encountered.

But the cold was less bitter here; strangely, increasing altitude on this curious planet brought warmth instead of cold, as on the Earth, because it raised one closer to the region of the Upper Winds, and here in the Moun-

tains of Eternity the Underwind howled less persistently, broken into gusts by the mighty peaks

And the vegetation was less sparse. Everywhere were the veined and bulbous masses, and Ham had to tread carefully lest he repeat the unpleasant experience of stepping on one and hearing its moaning whimper of pain. Pat had no such scruples, insisting that the whimper was but a tropism; that the specimens she pulled up and dissected felt no more pain than an apple that was eaten, and that, anyway, it was a biologist's business to be a biologist.

SOMEWHERE off among the peaks shrilled the mocking laughter of a triops, and in the shifting shadows at the extremities of their beams, Ham imagined more than once that he saw the forms of these demons of the dark. If there they were, however, the light kept them at a safe distance, for no stones hummed past.

Yet it was a queer sensation to walk thus in the center of a moving circle of light; he felt continually as if just beyond the boundary of visibility lurked Heaven only knew what weird and incredible creatures, though reason argued that such monsters couldn't have remained undetected.

Ahead of them their beams glistened on an icy rampart, a bank or cliff that stretched right and left across their course.

Pat gestured suddenly toward it. "Look there!" she exclaimed, holding her light steady "Caves in the ice—burrows, rather See?"

He saw—little black openings as large, perhaps, as a manhole cover, a whole row of them at the base of the ice rampart Something black skittered laughing up the glassy slope and away—a triops. Were these the dens of the beast? He squinted sharply.

"Something's there!" he muttered to Pat. "Look! Half the openings have something in front of them—or are those just rocks to block the entrance?"

Cautiously, revolvers in hand, they advanced There was no more motion, but in the growing intensity of the beams, the objects were less and less rocklike, and at last they could make out the veinings and fleshy bulbousness of life.

At least the creature were a new variety. Now Ham could distinguish a row of eyelike spots, and now a multiplicity of legs beneath them. The things were like inverted bushel baskets, about the size and contour, veined, flabby, and featureless save for a complete circle of eye spots And now he could even see the semitransparent lids that closed, apparently, to shield the eyes from the pain of their lights.

They were barely a dozen feet from one of the creatures Pat, after a moment of hesitation, moved directly before the motionless mystery.

"Well!" she said. "Here's a new one, Ham Hello, old fella!"

An instant later both of them were frozen in utter consternation, completely overwhelmed by bewilderment, amazement, and confusion. Issuing, it seemed, from a membrane at the top of the creature, came a clicking, high-pitched voice.

"Hello, fella!" it said.

There was an appalled silence. Ham held his revolver, but had there been need, he couldn't have used it, nor even remembered it He was paralyzed, stricken dumb.

But Pat found her voice. "It—isn't real!" she said faintly. "It's a tropism The thing just echoed whatever sounds strike it. Doesn't it, Ham? Doesn't it?"

"I—I—of course!" He was staring at the lidded eyes "It must be. Listen!" He leaned forward and yelled, "Hello!" directly at the creature. "It'll answer."

It did. "It isn't a tropism," it clicked in shrill but perfect English.

"*That's* no echo!" gasped Pat. She backed away. "I'm scared," she whimpered, pulling at Ham's arm. "Come away—quick!"

He thrust her behind him. "I'm just a timid Yankee," he grunted, "but I'm going to cross-question this living phonograph until I find out what—or who—makes it tick."

"No! No, Ham! I'm scared!"

"It doesn't look dangerous," he observed.

"It isn't dangerous," remarked the thing on the ice.

Ham gulped, and Pat gave a horrified little moan.

"Who—who are you?" he faltered.

There was no answer. The lidded eyes stared steadily at him.

"What are you?" he tried again.

Again no reply.

"How do you know English?" he ventured.

The clicking voice sounded: "I isn't know English."

"Then—uh—then why do you speak English?"

"You speak English," explained the mystery, logically enough.

"I don't mean why. I mean *how!*"

But Pat had overcome a part of her terrified astonishment, and her quick mind perceived a clue. "Ham," she whispered tensely, "it uses the words we use. It gets the meaning from us!"

"I gets the meaning from you," confirmed the thing ungrammatically.

Light dawned on Ham. "Lord!" he gasped. "Then it's up to us to give it a vocabulary."

"You speak, I speak," suggested the creature.

"Sure! See, Pat? We can say just anything." He paused. "Let's see——" 'When in the course of human events it——' "

"Shut up!" snapped Pat. "Yankee! You're on crown territory now. 'To be or not to be: that is the question just——' "

Ham grinned and was silent. When she had exhausted her memory, he took up the task: "Once upon a time there were three bears——"

AND SO it went. Suddenly the situation struck him as fantastically ridiculous—there was Pat carefully relating the story of Little Red Riding Hood to a humorless monstrosity of the night side of Venus! The girl cast him a perplexed glance as he roared into a gale of laughter.

"Tell him the one about the traveling man and the farmer's daughter!" he said, choking. "See if you can get a smile from him!"

She joined his laughter. "But it's really a serious matter," she concluded. "Imagine it, Ham! Intelligent life on the dark side! Or *are* you intelligent?" she asked suddenly of the thing on the ice.

"I am intelligent," it assured her. "I am intelligently intelligent."

"At least you're a marvelous linguist," said the girl. "Did you ever hear of learning English in half an hour, Ham? Think of that!" Apparently her fear of the creature had vanished.

"Well, let's make use of it," suggested Ham. "What's your name, friend?"

There was no reply.

"Of course," put in Pat. "He can't tell us his name until we give it to him in English, and we can't do that because—— Oh, well, let's call him Oscar, then. That'll serve."

"Good enough. Oscar, what are you, anyway?"

"Human. I'm a man."

"Eh? I'll be damned if you are!"

"Those are the words you've given me. To me I am a man to you."

"Wait a moment. 'To me I am——' I see, Pat. He means that the only

It was a startling sight in the wavering light of the lamps. After a moment Pat laughed: "Hello, Oscar," she said.

words we have for what he considers himself are words like man and human. Well, what are your people, then?"

"People."

"I mean your race. What race do you belong to?"

"Human."

"Ow!" groaned Ham. "You try, Pat."

"Oscar," said the girl, "you say you're human. Are you a mammal?"

"To me man is a mammal to you."

"Oh, good heavens!" She tried again. "Oscar, how does your race reproduce?"

"I have not the words."

"Are you born?"

The queer face, or faceless body, of the creature changed slightly. Heavier

lids dropped over the semitransparent ones that shielded its many eyes; it was almost as if the thing frowned in concentration.

"We are not born," he clicked.

"Then—seeds, spores, parthenogenesis? Or fissure?"

"Spores," shrilled the mystery, "and fissure."

"But——"

She paused, nonplused. In the momentary silence came the mocking hoot of a triops far to their left, and both turned involuntarily, stared, and recoiled aghast. At the very extremity of their beam one of the laughing demons had seized and was bearing away what was beyond doubt one of the creatures of the caves. And to add to the horror, all the rest squatted in utter indifference before their burrows.

"Oscar!" Pat screamed. "They got one of you!"

She broke off suddenly at the crack of Ham's revolver, but it was a futile shot.

"O-oh!" she gasped. "The devils! They got one!" There was no comment at all from the creature before them. "Oscar," she cried, "don't you care? They murdered one of you! Don't you understand?"

"Yes."

"But—doesn't it affect you at all?" The creatures had come, somehow, to hold a sort of human sympathy in Pat's mind. They could talk; they were more than beasts. "Don't you care at all?"

"No."

"But what are those devils to you? What do they do that you let them murder you?"

"They eat us," said Oscar placidly.

"Oh!" gasped Pat in horror. "But—but why don't——"

She broke off; the creature was backing slowly and methodically into its burrow.

"Wait!" she cried "They can't come here! Our lights——"

The clicking voice drifted out: "It is cold I go because of the cold."

There was silence.

IT WAS colder. The gusty Underwind moaned more steadily now, and glancing along the ridge, Pat saw that every one of the cave creatures was slipping like Oscar into his burrow. She turned a helpless gaze on Ham.

"Did I—dream this?" she whispered.

"Then both of us dreamed it, Pat." He took her arm and drew her back toward the rocket, whose round ports glowed an invitation through the dusk

But once in the warm interior, with her clumsy outer garments removed, Pat drew her dainty legs under her, lighted a cigarette, and fell to more rational consideration of the mystery.

"There's something we don't understand about this, Ham. Did you sense anything queer about Oscar's mind?"

"It's a devilishly quick one!"

"Yes; he's intelligent enough. Intelligence of the human level, or even"—she hesitated—"above the human. But it isn't a human mind It's different, somehow—alien, strange. I can't quite express what I felt, but did you notice Oscar never asked a question? Not one!"

"Why—he didn't, did he? That's queer!"

"It's darn queer. Any human intelligence, meeting another thinking form of life, would ask plenty of questions We did." She blew a thoughtful puff of smoke. "And that isn't all. That—that indifference of his when the triops attacked his fellow—was that human, or even earthly? I've seen a hunting spider snatch one fly from a swarm of them without disturbing the rest, but could that happen to intelligent creatures? It couldn't; not even to brains as undeveloped as those in a herd of deer, or a flock of sparrows. Kill one and you frighten all."

"That's true, Pat. They're damn

queer ducks, these fellow citizens of Oscar's. Queer animals."

"Animals? Don't tell me you didn't notice, Ham!"

"Notice what?"

"Oscar's no animal. He's a plant—a warm-blooded, mobile vegetable! All the time we were talking to him he was rooting around below him with his—well, his root And those things that looked like legs—they were pods. He didn't walk on them; he dragged himself on his root. And what's more he——"

"What's more?"

"What's more, Ham, those pods were the same sort as the ones the triops threw at us in the canyon of the Mountains of Eternity, the ones that choked and smothered us so——"

"The ones that laid you out so cold, you mean."

"Anyway, I had wits enough to notice them!" she retorted, flushing. "But there's part of the mystery, Ham. Oscar's mind is a vegetable mind!" She paused, puffing her cigarette as he packed his pipe.

"Do you suppose," she asked suddenly, "that the presence of Oscar and his crew represents a menace to human occupancy of Venus? I know they're dark-side creatures, but what if mines are discovered here? What if there turns out to be a field for commercial exploitation? Humans can't live indefinitely away from sunlight, I know, but there might be a need for temporary colonies here, and what then?"

"Well, what then?" rejoined Ham.

"Yes; what then? Is there room on the same planet for two intelligent races? Won't there be a conflict of interests sooner or later?"

"What of it?" he grunted. "Those things are primitive, Pat. They live in caves, without culture, without weapons. They're no danger to man."

"But they're magnificently intelligent. How do you know that these we've seen aren't just a barbaric tribe and that somewhere on the vastness of the dark side there isn't a vegetable civilization? You know civilization isn't the personal prerogative of mankind, because look at the mighty decadent culture on Mars and the dead remnants on Titan. Man has simply happened to have the strangest brand of it, at least so far"

"That's true enough, Pat," he agreed. "But if Oscar's fellows aren't any more pugnacious than they were toward that murderous triops, then they aren't much of a menace."

She shuddered. "I can't understand that at all. I wonder if——" She paused, frowning.

"If what?"

"I—don't know. I had an idea—a rather horrible idea" She looked up suddenly. "Ham, to-morrow I'm going to find out exactly how intelligent Oscar really is. Exactly how intelligent—if I can."

IV.

THERE were certain difficulties, however. When Ham and Pat approached the ice ridge, plodding across the fantastic terrain, they found themselves in utter perplexity as to which of the row of caves was the one before which they had stood in conversation with Oscar. In the glittering reflections from their lamps each opening appeared exactly like every other, and the creatures at their mouths stared at them with lidded eyes in which there was no readable expression.

"Well," said Pat in puzzlement, "we'll just have to try. You there, are you, Oscar?"

The clicking voice sounded: "Yes"

"I don't believe it," objected Ham. "He was over more to the right Hey! Are you Oscar?"

Another voice clicked: "Yes"

"You can't *both* be Oscar!"

Pat's choice responded: "We are all Oscar."

"Oh, never mind," cut in Pat, forestalling Ham's protests. "Apparently what one knows they all know, so it doesn't make any difference which we choose. Oscar, you said yesterday you were intelligent. Are you more intelligent than I am?"

"Yes. Much more intelligent."

"Hah!" snickered Ham. "Take that, Pat!"

She sniffed. "Well, that puts him miles above you, Yankee! Oscar, do you ever lie?"

Opaque lids dropped over translucent ones. "Lie," repeated the shrill voice. "Lie. No. There is no need."

"Well, do you——" She broke off suddenly at the sound of a dull pop. "What's that? Oh! Look, Ham, one of his pods burst!" She drew back.

A sharply pungent odor assailed them, reminiscent of that dangerous hour in the canyon, but not strong enough this time to set Ham choking or send the girl reeling into unconsciousness. Sharp, acrid, and yet not entirely unpleasant.

"What's that for, Oscar?"

"It is so we——" The voice cut short.

"Reproduce?" suggested Pat.

"Yes. Reproduce. The wind carries our spores to each other. We live where the wind is not steady."

"But yesterday you said fissure was your method."

"Yes. The spores lodge against our bodies and there is a——" Again the voice died.

"A fertilization?" suggested the girl.

"No"

"Well, a—I know! An irritation!"

"Yes."

"That causes a tumorous growth?"

"Yes. When the growth is complete, we split."

"Ugh!" snorted Ham. "A tumor!"

"Shut up!" snapped the girl. "That's all a baby is—a normal tumor."

"A normal—— Well, I'm glad I'm not a biologist! Or a woman!"

"So'm I," said Pat demurely. "Oscar, how much do you know?"

"Everything."

"Do you know where my people come from?"

"From beyond the light."

"Yes; but before that?"

"No."

"We come from another planet," said the girl impressively. At Oscar's silence she said: "Do you know what a planet is?"

"Yes."

"But did you know before I said the word?"

"Yes. Long before."

"But how? Do you know what machinery is? Do you know what weapons are? Do you know how to make those things?"

"Yes."

"Then—why don't you?"

"There is no need."

"No need!" she gasped. "With light—even with fire—you could keep the triopses—trioptes, I mean—away. You could keep them from eating you!"

"There is no need."

She turned helplessly to Ham.

"The thing's lying," he suggested.

"I—don't think so," she murmured. "It's something else—something we don't understand. Oscar, how do you know all those things?"

"Intelligence."

At the next cave another pod popped sullenly.

"But how? Tell me how you discover facts."

"From any fact," clicked the creature on the ice, "intelligence can build a picture of the——" There was silence.

"Universe?" she suggested.

"Yes. The universe. I start with one fact and I reason from it. I build a picture of the universe. I start with another fact. I reason from it. I find that the universe I picture is the same

as the first. I know that the picture is true"

BOTH listeners stared in awe at the creature. "Say!" gulped Ham. "If that's true we could find out anything from Oscar! Oscar, can you tell us secrets that we don't know?"

"No."

"Why not?"

"You must first have the words to give me. I cannot tell you that for which you have no words."

"It's true!" whispered Pat. "But, Oscar, I have the words time and space and energy and matter and law and cause. Tell me the ultimate law of the universe!"

"It is the law of——" Silence.

"Conservation of energy or matter? Gravitation?"

"No."

"Of—of God?"

"No."

"Of—life?"

"No. Life is of no importance."

"Of—what? I can't think of another word."

"There's a chance," said Ham tensely, "that there is no word!"

"Yes," clicked Oscar. "It is the law of chance. Those other words are different sides of the law of chance."

"Good Heaven!" breathed Pat. "Oscar, do you know what I mean by stars, suns, constellations, planets, nebulæ, and atoms, protons, and electrons?"

"Yes."

"But—how? Have you ever seen the stars that are above these eternal clouds? Or the Sun there beyond the barrier?"

"No. Reason is enough, because there is only one possible way in which the universe could exist. Only what is possible is real; what is not real is also not possible."

"That—that seems to mean something," murmured Pat. "I don't see exactly what. But, Oscar, why—why don't you use your knowledge to protect yourselves from your enemies?"

"There is no need. There is no need to do anything In a hundred years we shall be——" Silence.

"Safe?"

"Yes—no."

"What?" A horrible thought struck her. "Do you mean—extinct?"

"Yes."

"But—oh, Oscar! Don't you *want* to live? Don't your people want to survive?"

"Want," shrilled Oscar. "Want—want—want That word means nothing."

"It means—it means desire, need."

"Desire means nothing. Need—need. No. My people do not need to survive."

"Oh," said Pat faintly. "Then why do you reproduce?"

As if in answer, a bursting pod sent its pungent dust over them. "Because we must," clicked Oscar. "When the spores strike us, we must."

"I—see," murmured Pat slowly. "Ham, I think I've got it. I think I understand Let's get back to the ship."

Without farewell she turned away and he followed her thoughtfully. A strange listlessness oppressed him.

They had one slight mishap A stone flung by some stray trioptes sheltered behind the ridge shattered the left lamp in Pat's helmet. It seemed hardly to disturb the girl; she glanced briefly aside and plodded on. But all the way back, in the gloom to their left now illumined only by his own lamp, hoots and shrieks and mocking laughter pursued them

Within the rocket Pat swung her specimen bag wearily to the table and sat down without removing her heavy outer garment. Nor did Ham; despite the oppressive warmth of it, he, too, dropped listlessly to a seat on the bunk.

"I'm tired," said the girl, "but not too

tired to realize what that mystery out there means."

"Then let's hear it."

"Ham," she said, "what's the big difference between plant and animal life?"

"Why—plants derive their sustenance directly from soil and air. Animals need plants or other animals as food."

"That isn't entirely true, Ham. Some plants are parasitic, and prey on other life. Think of the Hotlands, or think, even, of some terrestrial plants—the fungi, the pitcher plant, the *Dionæa* that trap flies."

"Well, animals move, then, and plants don't."

"That's not true, either. Look at microbes; they're plants, but they swim about in search of food."

"Then what *is* the difference?"

"Sometimes it's hard to say," she murmured, "but I think I see it now. It's this: Animals have desire and plants necessity. Do you understand?"

"Not a damn bit."

"Listen, then. A plant—even a moving one—acts the way it does because it *must*, because it's made so. An animal acts because it *wants* to, or because it's made so that it wants to."

"What's the difference?"

"There is a difference. An animal has will, a plant hasn't. Do you see now? Oscar has all the magnificent intelligence of a god, but he hasn't the will of a worm. He has reactions, but no desire. When the wind is warm he comes out and feeds; when it's cold he crawls back into the cave melted by his body heat, but that isn't will, it's just a reaction. He has no desires!"

HAM STARED, roused out of his lassitude. "I'll be damned if it isn't true!" he cried. "That's why he—or they—never ask questions. It takes desire or will to ask a question! And that's why they have no civilization and never will have!"

"That and other reasons," said Pat. "Think of this: Oscar has no sex, and in spite of your Yankee pride, sex has been a big factor in building civilization. It's the basis of the family, and among Oscar's people there is no such thing as parent and child. He splits; each half of him is an adult, probably with all the knowledge and memory of the original.

"There's no need for love, no place for it, in fact, and therefore no call to fight for mate and family, and no reason to make life easier than it already is, and no cause to apply his intelligence to develop art or science or—or anything!" She paused. "And did you ever hear of the Malthusian law, Ham?"

"Not that I remember."

"Well, the law of Malthus says that population presses on the food supply. Increase the food and the population increases in proportion. Man evolved under that law; for a century or so it's been suspended, but our race grew to be human under it."

"Suspended! It sounds sort of like repealing the law of gravitation or amending the law of inverse squares."

"No, no," she said. "It was suspended by the development of machinery in the nineteenth and twentieth centuries, which shot the food supply so far ahead that population hasn't caught up. But it will, and the Malthusian law will rule again."

"And what's that got to do with Oscar?"

"This, Ham: He never evolved under that law. Other factors kept his numbers below the limit of the food supply, and so his species developed free of the need to struggle for food. He's so perfectly adapted to his environment that he needs nothing more. To him a civilization would be superfluous!"

"But—then what of the triops?"

"Yes, the triops. You see, Ham, just

as I argued days ago, the triops is a newcomer, pushed over from the twilight zone. When those devils arrived, Oscar's people were already evolved, and they couldn't change to meet the new conditions, or couldn't change quickly enough. So—they're doomed.

"As Oscar says, they'll be extinct soon—and—and they don't even care!" She shuddered. "All they do, all they can do, is sit before their caves and think. Probably they think godlike thoughts, but they can't summon even a mouselike will. That's what a vegetable intelligence is; that's what it has to be!"

"I think—I think you're right," he muttered. "In a way it's horrible, isn't it?"

"Yes." Despite her heavy garments she shivered. "Yes; it's horrible. Those vast, magnificent minds and no way for them to work. It's like a powerful gasoline motor with its drive shaft broken, and no matter how well it runs it can't turn the wheels. Ham, do you know what I'm going to name them? The *Lotophagi Veneris*—the Lotus Eaters! Content to sit and dream away existence while lesser minds—ours and the trioptes'—battle for their planet."

"It's a good name, Pat." As she rose he asked in surprise: "Your specimens? Aren't you going to prepare them?"

"Oh, to-morrow." She flung herself, parka and all, on her bunk.

"But they'll spoil! And your helmet light—I ought to fix that."

"To-morrow," she repeated wearily, and his own languor kept him from further argument.

When the nauseous odor of decay awakened him some hours later Pat was asleep still garbed in the heavy suit. He flung bag and specimens from the door, and then slipped the parka from her body. She hardly stirred as he tucked her gently into her bunk.

V.

PAT never missed the specimen bag at all, and, somehow, the next day, if one could call that endless night a day, found them trudging over the bleak plateau with the girl's helmet lamp still unrepaired. Again at their left the wildly mocking laughter of the night dwellers followed them, drifting eerily down on the Underwind, and twice far-flung stones chipped glittering ice from neighboring spires. They plodded listlessly and silently, as if in a sort of fascination, but their minds seemed strangely clear.

Pat addressed the first Lotus Eater they saw. "We're back, Oscar," she said with a faint rebirth of her usual flippancy. "How'd you spend the night?"

"I thought," clicked the thing.

"What'd you think about?"

"I thought about——" The voice ceased.

A pod popped, and the curiously pleasant pungent odor was in their nostrils.

"About—us?"

"No."

"About—the world?"

"No."

"About—— What's the use?" she ended wearily. "We could keep that up forever, and perhaps never hit on the right question."

"If there is a right question," added Ham. "How do you know there are words to fit it? How do you even know that it's the kind of thought our minds are capable of conceiving? There must be thoughts that are beyond our grasp."

Off to their left a pod burst with a dull pop. Ham saw the dust move like a shadow across their beams as the Underwind caught it, and he saw Pat draw a deep draft of the pungent air as it whirled around her. Queer how pleasant the smell was, especially since it

was the same stuff which in higher concentration had nearly cost their lives. He felt vaguely worried as that thought struck him, but could assign no reason for worry.

He realized suddenly that both of them were standing in complete silence before the Lotus Eater. They had come to ask questions, hadn't they?

"Oscar," he said, "what's the meaning of life?"

"No meaning. There is no meaning."

"Then why fight for it so?"

"We do not fight for it. Life is unimportant."

"And when you're gone, the world goes on just the same? Is that it?"

"When we are gone it will make no difference to any except the trioptes who eat us."

"Who eat you," echoed Ham.

There was something about that thought that did penetrate the fog of indifference that blanketed his mind. He peered at Pat, who stood passively and silently beside him, and in the glow of her helmet lamp he could see her clear gray eyes behind her goggles, staring straight ahead in what was apparently abstraction or deep thought. And beyond the ridge sounded suddenly the yells and wild laughter of the dwellers in the dark.

"Pat," he said.

There was no answer.

"Pat!" he repeated, raising a listless hand to her arm. "We have to go back." To his right a pod popped. "We have to go back," he repeated.

A SUDDEN shower of stones came glancing over the ridge. One struck his helmet, and his forward lamp burst with a dull explosion. Another struck his arm with a stinging pain, though it seemed surprisingly unimportant.

"We have to go back," he reiterated doggedly.

Pat spoke at last without moving. "What's the use?" she asked dully.

He frowned over that. What *was* the use? To go back to the twilight zone? A picture of Erotia rose in his mind, and then a vision of that honeymoon they had planned on the Earth, and then a whole series of terrestrial scenes—New York, a tree-girt campus, the sunny farm of his boyhood. But they all seemed very far away and unreal.

A violent blow that stung his shoulder recalled him, and he saw a stone bound from Pat's helmet. Only two of her lamps glowed now, the rear and the right, and he realized vaguely that on his own helmet shone only the rear and the left. Shadowy figures were skittering and gibbering along the crest of the ridge now left dark by the breaking of their lights, and stones were whizzing and spattering around them.

He made a supreme effort and seized her arm. "We've got to go back!" he muttered.

"Why? Why should we?"

"Because we'll be killed if we stay."

"Yes. I know that, but——"

He ceased to listen and jerked savagely at Pat's arm. She spun around and staggered after him as he turned doggedly toward the rocket.

Shrill hoots sounded as their rear lamps swept the ridge, and as he dragged the girl with infinite slowness, the shrieks spread out to the right and left. He knew what that meant; the demons were circling them to get in front of them where their shattered forward lamps cast no protecting light.

Pat followed listlessly, making no effort of her own. It was simply the drag of his arm that impelled her, and it was becoming an intolerable effort to move even himself. And there directly before him, flitting shadows that bowled and hooted, were the devils that sought their lives.

Ham twisted his head so that his right lamp swept the area. Shrieks

sounded as they found shelter in the shadows of peaks and ridges, but Ham, walking with his head sidewise, tripped and tumbled

Pat wouldn't rise when he tugged at her "There's no need of it," she murmured, but made no resistance when he lifted her.

An idea stirred vaguely; he bundled her into his arms so that her right lamp shot its beam forward, and so he staggered at last to the circle of light about the rocket, opened the door, and dumped her on the floor within.

He had one final impression. He saw the laughing shadows that were the trioptes skipping and skittering across the darkness toward the ridge where Oscar and his people waited in placid acceptance of their destiny.

VI.

THE ROCKET was roaring along at two hundred thousand feet, because numberless observations and photographs from space had showed that not even the vast peaks of the Mountains of Eternity project forty miles above the planet's surface. Below them the clouds glistened white before and black behind, for they were just entering the twilight zone At that height one could even see the mighty curvature of the planet

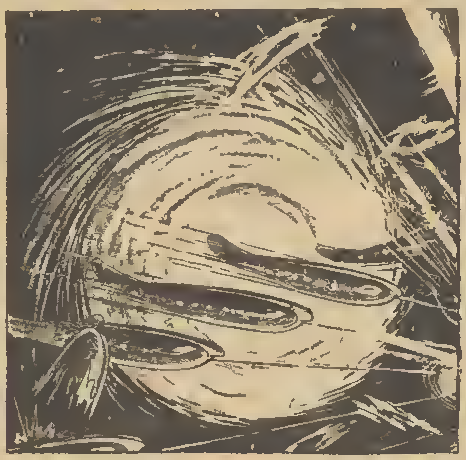
"Half cue ball, half eight ball," said Ham, staring down "Hereafter we stick to the cue-ball half."

"It was the spores," proceeded Pat, ignoring him. "We *knew* they were narcotic before, but we couldn't be expected to guess that they'd carry a drug as subtle as that—to steal away your will and undermine your strength. Oscar's people are the Lotus Eaters and the Lotus, all in one. But I'm—somehow, I'm sorry for them. Those colossal, magnificent, useless minds of theirs!" She paused. "Ham, what woke you up to what was happening? What snapped you out of it?"

"Oh, it was a remark of Oscar's, something about his being only a square meal for a triops."

"Well?"

"Well, did you know we've used up all our food? That remark reminded me that I hadn't eaten for two days!"



Prowler of the Wastelands

by HARL VINCENT

THE PROWLER sniffed of the breeze suspiciously. Its warmth was most gratifying, for he had traveled day and night from the northern wastes where the bitter chill of an early winter was already a threat to his very existence.

But this breeze carried to his sensitive nostrils an assortment of smells that made him uneasy and fearful. Uneasy, because they roused in his memory faint recollections which antedated his first clumsy scamperings at the side of his mother, who had long since died. Fearful, because they were entirely unfamiliar in any experience of his maturity.

He did not know that the smells betokened his nearness to man's greatest place of habitation. In fact, the prowler would not have recognized man as such had a representative of the breed appeared in the brush beside him. He had never seen a man.

A peculiarly lonely creature, the prowler, since he was the only one of his kind in the vastness of the wastelands. His three short years, since leaving his mother cold and still in the northern snows, had comprised a ceaseless search for food. The wild dogs, which were the only other creatures of any size in all the wastelands, had early learned to avoid him. The prowler was more than a match for the fiercest of them, even when they attacked him in a pack.

He was a yellow-furred hybrid, essentially feline in appearance—one hundred and thirty pounds of him. Besides being of mixed ancestry, he was possessed of transplanted glands from various species and of genes which provided him with instincts which had not as yet been aroused. The prowler could not know that he was the product of a twenty-third century biological experiment.

Many hours had passed since he had last tasted food, and the agonized gnawing at his vitals caused him to forget his misgivings regarding the smells. He padded swiftly south and east in the direction from which they were drifting. The brush was bare and dry; fallen leaves carpeted the ground. There was no sound of life save the distant baying of a pack of wild dogs. Still the prowler went on.

Presently he saw a cluster of huge mounds and his pace quickened. He did not know that the mounds had been formed by the crumbling walls of ancient dwelling places of man, but he did know that there were many more such clusters of them in the wastelands. And he knew there would be rats in the diggings beneath them. He disappeared into what had once been the cellar of a Hoboken warehouse.

An hour later, his hunger appeased, he crept out into the fading light of day. He sniffed of the breeze, which now had cooled somewhat. The smells were stronger than before, and now they piqued his curiosity; more, they drew him almost irresistibly. He picked his way rapidly through the moss-covered ruins and at length came to an open space where the view stopped him in his tracks. Puzzled by the vast strangeness that lay before him, he sat on his haunches and stared.

He was at the edge of a broad expanse of water, and across it was a towering wall that gleamed dazzlingly in the light of the setting sun. The prowler

The prowler had heard, and obeyed. He shook his head to rid himself of the electrodes, then leapt to the floor. His pur was strident.

could not know that this was the Hudson River separating him from what was the west barrier of New York, the greatest of the eleven cities of United North America. He could not know that the sweeping line of hundred-level-high habitations which housed nearly fifty millions of humans was the place of his birth, nor that the arched bottomings of the sweep which crossed the river swung it southwestward to include what had once been the cities of Jersey City and Newark. He knew only that the smells and the very sight of the magnificent bulwark drew him and tugged at heartstrings that were within his being unknown and unsuspected.

He knew nothing of history. The ruins and desolation of the wastelands he had taken as a matter of course. That the desertion of the land by humans and the concentration of them in

the cities was in any way connected with the mystery of his own existence could not occur as a sequence of thoughts in his synthetic mind.

The prowler did have a mind. A mind imbued with polyglot ideas culled from the knowledge of masters of the world's learning, and with instincts and desires and qualities ordinarily only possessed by the race of man. A mind imbued with dormant instincts and desires and qualities now ready for the awakening.

Rising from his haunches, he resumed his steady padding. The way led southward along the river, and as he progressed the smells of man's habitation grew ever more an anæsthetic in his nostrils. It was imperative that he find what was at the end of this trail.

He did find it. Where the sweep of the city bulwark meets the west shore of the Hudson, where once was the Erie Station on the long-forgotten Hudson and Manhattan tube, the prowler found an open door in the great curving wall of noncorrosive steel. The smells were much more in evidence here. He sniffed and remembered more poignantly his earliest days. Dangling from his mother's mouth, before his eyes first opened to the sights of the world, he had left this place. A fugitive, though he knew it not, from a life created and meticulously planned for in one of man's laboratories.

The noises that came to his ears brought fainter recollection than had the smells, although his memory stirred vaguely with the musical purr of the city's vital machinery. The shrill sound of cars passing through the pneumatic tubes and the swish of swiftly-moving lifts meant still less to him. But a strange urge was upon him; he could not resist the call of whatever was inside. He passed through the door.

IN THE corridor the sounds and the smells were overpowering in their influence on the prowler. Dazed, and with his heart pounding a tattoo within his deep chest, he moved silently and with increased speed toward the far point where lights were brighter. The smooth, hard metal was comfortably warm under his cushioned paws, the air he breathed was moistly redolent of life—of the life he suddenly knew he was a part of by right of birth.

He rounded a corner and blinked in the dazzling illumination that struck down on him from high above. This was an enormous place he had come into, one of the public squares of the lowest level of the city; it was swarming with creatures, some of whom lived and breathed, some of which were ponderous yet dexterously moving mechanisms. Instinctively, the prowler knew the difference between man and robot.

No creatures like these were in the wastelands. These creatures walked erect on their hind legs, the living ones and the machines alike. And those that lived were friends, the prowler knew; they were the sort he had unconsciously sought for three years. The others he was not so sure about. A longing to be with these erect, living creatures came to him so strongly that he forgot his outland caution and padded out between the pillars and into the brilliance of the open space. One of the metal creatures, clanking at each step, lashed out with a writhing something that was like a wind-whipped vine. It stung cruelly when it struck home and set the prowler back on his haunches, snarling.

He came out of his daze in an instant, and was in the air as if propelled by a huge steel spring, hurling himself against the barrellike torso of the metal one. His unsheathed claws slithered over the smooth cylinder harmlessly, but the robot toppled heavily to the floor. Something tinkled as it smashed and the thing was quiet underneath him.

Others of the creatures who walked

erect but had no life in them were rushing toward him, but some of the living ones were here as well. There were raucous sounds from the first, loud but reassuring shoutings from the others. These shoutings were not like the baying of wild dogs; they were purposeful and confident. Somehow they conveyed understanding. The metal ones fell back and stood stiffly inactive.

One of the men, a leader among the group, had called off the robot police. "So help me," he said, "it's one of Rosso's animals." He reached down and patted the head of the prowler, who immediately relaxed his tensed muscles.

"What's it to us?" another replied. "They shouldn't let 'em run loose like this."

"They don't," retorted the first. "They guard them day and night; the beasts are valuable. That's what makes me think something is queer about this. Maybe we can turn it to our advantage."

"Meaning what?"

"A reward." The first man was examining one of the prowler's silken ears.

The great yellow-furred animal closed his eyes contentedly. He had returned at last to his rightful home and was among the kind to whom he belonged. His wanderings were over. An awakening inner consciousness told him these things definitely and he gave himself to a sense of peace and security he had never known. He looked gratefully into the eyes of the one who fingered his ear.

"Hm-m-m," the man grunted. "Almost seems as if he wanted to talk to us. Beauty, isn't he?"

The others of the living ones who walked erect were moving away, losing interest, but the first one continued his fingering of the ear. At last he clucked with satisfaction.

"Found your number, big fellow," he told the prowler. "Come on, we'll get in touch with the great Rosso."

Somehow the words made sense. The prowler rose to his feet and kept close to the feet of his benefactor as they moved away amidst the pillars. Soon the two, man and beast, were in a closed-in place where the lights were not so bright and where the man spoke soft words into a disk that glowed suddenly into life. The face of another creature appeared as if by magic in the disk and words passed between the living one and the one pictured. It reminded the prowler of reflections of himself he had seen in quiet pools.

The words from the disk were sharply spoken. "What number did you say?"

"22X101," the living one replied, "and he hasn't any collar."

"It seems impossible. But bring him here, man, bring him to me at once. There's a thousand credit vouchers in it for you."

The man clucked his tongue with satisfaction as the face vanished from view, and the prowler thrilled with new excitement. Something of great moment was about to occur.

Then they were gliding through a narrow passage where the floor itself moved swiftly and smoothly, carrying them with it as it went. They shifted to a cage that rose speedily up through a shaft. The prowler was seized with a hollow feeling in his belly. He sat down. And then they were out in another passage which led to a door. When that door was opened to them and the prowler saw what lay beyond it, he made a soft rumbling sound in his throat. He purred. Here indeed was the end of the trail.

ANTON ROSSO paid gladly, once he had examined the tiny markings punched in the prowler's ear. There could be no doubt that this was the long lost 22X101, and finding him was a stroke of good fortune such as the famous zoölogist had not encountered in

many a day. He curtly dismissed the visitor from the lower levels, who stood thumbing over the sheaf of credit vouchers, and gave his attention to 22X101.

"Well, old boy," he chortled. "Fancy having you back with me! What a piece of good luck! For both of us, though you don't know it. Or maybe you do know; you seem to be glad at that."

He cupped the prowler's great head in his two hands, looking long and deep into the beast's eyes, then drew in a sharp whistling breath.

"A miracle—almost," he exulted. "And to think your line had been given up as lost! Come along boy; we start to do things now."

The prowler nuzzled the slim white hands and trotted obediently after Rosso. They entered an adjoining room where were gleaming white walls and clean smells, confusing jumbles of mechanisms, and tables with soft padded tops.

"Here, boy, jump up here," breathed Rosso, indicating one of the high tables.

There was understanding conveyed by the softly-spoken command. The prowler took the leap easily and gracefully, then lay on the pad with his chin between his forepaws. He trembled with eager anticipation, knowing instinctively that something important and desirable was to happen to him. The rhythm of his pur shortened with excitement.

Rosso grinned delightedly, then called loudly: "Strawn!"

A second white-coated man came into the room and looked at the prowler. "Man alive!" he exclaimed. "Where'd this one come from? He's a——"

"He's 22X101."

The other looked blank.

"Oh, yes, I forgot," Rosso explained. "You weren't here at that time. This fellow's the last of the 22X line; he's the one who was carried off into the wastelands by his mother almost as soon as he was born. There's a strain in him, and qualities I've never been able to duplicate—the Woth chromosomes, you know. And transplanted glands. Even human brain cells."

Strawn breathed hard. "He doesn't look——"

"No, not yet. There must be an injection of the synthesized hormone 2X1. The metamorphosis will follow."

"Metamorphosis!"

"Not physical—mental." Rosso turned up his sleeves and went to the washbowl. "Don't stand there staring, man. Get the vial."

"He's a knock-out," persisted Strawn, his eyes never leaving the prowler. "For Lolita, perhaps?"

"Lolita, hell!" snorted Rosso. "She couldn't raise the price. This fellow's worth a small fortune."

Strawn shrugged, dragged his gaze from the great yellow cat by sheer force of will, and turned to the cabinet where the mysterious liquids and powders of Rosso's trade were stored.

The prowler, of course, had no way of knowing what it was all about. But a submerged sixth sense told him that things were as they should be, that this was his destiny, that the urges of his inner being which he had never understood were at last to reach fruition. The old life was forever behind him, he knew, and a new life was to open.

When Rosso approached the table with a glistening cylinder in his hand, the prowler shivered with ecstatic expectation. And when the hypodermic needle plunged home behind his shoulder blade he winced only slightly, looking up into the grave lean face of Rosso. Molten fire coursed suddenly through his veins and the human features above him blurred into nothingness.

THIS establishment and profession of Rosso's, unique in the annals of science, had been handed down from fa-

ther to son through four generations. Like his paternal ancestors before him, Rosso was an expert cytonomist, biologist, veterinarian, and a psychologist as well. His business was to supply hybrid animals of almost human intelligence as pets to the luxury-loving inhabitants of the upper levels of the cities as well as for their entertainment in exclusive closed-circle theaters and more public visionphone broadcasts.

More than a century earlier, when the centralization of United North America's population in the eleven cities and the mechanization of those cities had been complete, there had come an epidemic of wide and disastrous extent which had brought about the governmental order for the extermination of all animal pets in the union. The wastelands had long since been ravaged of all animal life save only the few packs of roaming and savage wild dogs, and so millions of children and idle women were deprived of the pets they loved.

The Rosso of that generation had seen business possibilities in the situation, and, being an experimental biologist and an animal lover of sorts had chartered a stratosphere plane and searched the jungles which yet remained in the heart of Africa and in South America for the progenitors of a new race of pets. Secretly he returned to United North America with an assorted cargo of jungle creatures, many of which were felines of one kind or another. His work with them began.

Although his first efforts were discouraging, although a number of his animals met with death in the early stages of his experimenting, he succeeded in producing several new strains by inoculation, endocrane gland manipulation, and cross breeding. Progenitors of the new lines included *Felis leo, Cynælurous jubata, Felis serval, and Felis concolor.*

As time went on, the original Rosso and his descendants learned more and more of the control of transmitted genes, the feeding with synthesized and natural hormones, the transplantation of entire glands and of brain and nerve cells. They produced increasingly handsome animals and succeeded in educating them to intelligence nearly approaching that of humankind. Anton Rosso, in his 22X strain had produced an almost pure line which was abruptly discontinued with the loss of the prowler. Now he could reestablish that line.

Until now, Rosso's animals of less pure strain and greatly lower intelligence had brought fancy prices from dwellers in the upper levels who desired them as pets and from the theatrical profession who used them in their acts. A creature like 22X101 was bound to have a market value greatly in excess of any that had gone before. It only remained for the injected hormones to get in their work.

When Rosso told his assistant Strawn there would be a metamorphosis he had not overstated the facts of the matter. His own father had learned much of the mental metamorphoses to be accomplished by the use of hormones following the usual cytological modifications made in the prenatal operations on embryos within the bodies of their maternal progenitors. Anton Rosso, by further study and experimentation, had improved on such methods. He had produced 22X101, a creature with possibilities hitherto undreamed of. He had delved into the mystery of physical metamorphosis in such creatures as the common frog, in which the change from tadpole to fully-developed adult frog is greatly accelerated by the feeding of ordinary thyroid extract. And he was now putting into practice the experience he had gained.

22X101 had been under the influence of the hypodermic for more than four hours. The electrodes of the psycho-development machine had been clamped to his massive head the greater part of

that time, pouring into his subconscious, part-animal, part-human brain a mass of human knowledge, storing in the now activated cells inconceivable complexities of mathematics, literature, language, sociology. The prowler would awaken with an education.

And he would know at last the nature of those strange instincts which at times had previously puzzled him.

LOLITA, famous actress of the closed-circle theater and the ether lanes, was present when consciousness returned to the yellow-furred 22X101. She gasped with delight when his eyes opened and fixed themselves on her own.

"Why, Phil," she gurgled. "His eyes are blue—like a man's. He looks as if he might speak to me."

The man at her side was Phil Strawn, Rosso's assistant. He was nervous, perturbed. They had no business in the operating room at this time.

"Yes," he agreed. "He does look that way. And maybe—Rosso is thinking of operating on his vocal cords later—maybe he will talk one of these fine days."

The prowler heard and understood. The words held distinct and definite meaning now. His heart leaped suddenly with the hope that some day he might actually speak the language that now was his own to hear and fully comprehend. He continued to stare at Lolita. In his new-born mind flamed scraps of impressed thoughts of gods and goddesses of humankind. Lolita was a goddess, his goddess. He worshiped her on the instant.

Something of his intensity of feeling must have transmitted itself to the girl, for she drew back in embarrassment. The adoration in the blue eyes of the great cat was not to be mistaken.

"But, Phil," she whispered after a moment. "He's the grandest thing, really. Look at that golden fur on him. See how the light of understanding comes into his eyes. He's marvelous."

Strawn grunted. There *was* something about this big cat that was so nearly humanlike as to send a chill chasing down his spine. The animal was *too* human—it was sacrilegious to do a thing like this, to tamper with nature's laws——

His thoughts were rudely broken off by the girl's exclamation: "He'll be mine, Phil, if I have to steal him, or steal for him. He's a miracle, that's all—a miracle. And that's what I'll name him. In my act he'll be Miracle. Come, Miracle, get up and let's see how you look on your feet."

"N-no," Strawn objected nervously. "Rosso'll——"

But the prowler had heard and obeyed. He shook his great head to rid himself of the electrodes which clung to it, then bounded from the table to the floor, stretching his stiffened joints luxuriously as he looked up at Lolita. His purr was strident, victorious. He would answer to the name she had given him. Miracle.

"Oh, he *is* beautiful," breathed Lolita. "Will he be a drawing card? Get the charts, Phil, and let's see what he knows."

"Rosso'll be here," objected Strawn.

Lolita tossed her bright head. "I'll take care of him," she asserted. "Get the charts."

Strawn set up two white boards, one covered with black numbers and the commoner mathematical symbols, the other with printed words.

"Look, Miracle," said the girl eagerly. "Do you understand?"

The prowler made a helpless noise in his throat. If only he might have that gift of speech Strawn had hinted at.

"Nod your head—so—if you understand." Lolita illustrated the ordinary gesture of assent.

The great yellow cat nodded solemnly.

"What—what is the cube root of

twenty-seven?" Strawn asked him falteringly.

"Point to the number," the girl put in.

Miracle walked to the chart and extended a forepaw It was too large and clumsy; it covered a dozen of the numbers. Delicately he unsheathed a sharp curving claw and scratched at the number three.

"He *is* a miracle," admitted the man.

"What is my name?" inquired Lolita.

The metamorphosed prowler spelled it out by indicating letters on the second chart. Then he searched for words on the same chart and found them. "I am hungry," he pointed out swiftly.

"Good Lord!" choked Strawn. "He's human—it's ghastly."

"It's wonderful," the young actress corrected him. Her black eyes flashed with excitement. "Get him something to eat, Phil." She knelt on the metal floor and cuddled Miracle's great head in her arms.

Each beartbeat was an ache in his massive chest. The hunger of the soul was more agonizing than that of the stomach.

And then, before Strawn had gone for the food, Rosso was in the room bellowing. The prowler's back arched stiffly and he planted himself in front of the girl, hissing a warning.

Lolita's silvery laugh relieved the ensuing tension.

"I wouldn't sell him for a million," Rosso told her later. "Not for two million. He's invaluable to me right now; I must perpetuate his line. After that is assured—why, some upper-level dowager will be glad to meet my price. You can't buy him, Lolita."

"I *must* have him." Tears stood in the girl's eyes.

Miracle bad eaten largely and with satisfaction of bis first synthetic food and now lay at Lolita's feet. Rosso regarded the great cat through narrowed eyes.

"Seems to have taken to you plenty," he said slowly.

"And I to him. Can't you see—my act with him will be a hit they'll never get over? A natural! We can make your price for you in time."

"Impossible," Rosso rose from his chair and paced the floor.

Miracle could see that he was undecided. He got up and walked behind him, rubbing against his legs, endeavoring to add his own pleadings to those of Lolita.

"I'll be damned!" said Rosso, sitting down again. "Tell you what I'll do. You insure him for two million, promise to leave him with me on week-ends, and split the profits of your act with me and I'll let you have bim for a year. After that we'll see."

Strawn, joining them, scowled darkly at Lolita's demonstrations. In her joy and excitement she had flung herself on Rosso's knees and hugged him enthusiastically. Miracle suspected that Strawn loved the girl and was jealous. He succeeded in making an odd chuckling sound in his throat, which caused Strawn to peer at him sharply.

There were lawyers and signed contracts then, after which Miracle went away with Lolita.

A LONG and, to Miracle, deliriously happy training period followed. He learned to walk on his hind legs and to wear the habiliments of man. Acrobatics of the most intricate sort came next, then an astonishingly graceful dance number he performed with Lolita. A huge instrument was built for him, an instrument similar to a typewriter, but which projected letters two feet high on a screen when he depressed the keys. By its use he was able to converse intelligently and to answer before an audience questions which might be propounded to him.

A famous surgeon performed a preliminary operation in his throat which

made him sick for three days. It would be months before the second operation could take place, probably more than a year before he could be made to speak in humanlike voice. But the thought of it was fascinating and ever recurrent in his mind.

He was with Lolita constantly. Their appearance together in public streets or in the squares was always a signal for a near riot, so they stayed for the most part in her upper-level apartments when not in the hall of rehearsals. Here the girl would read to him by the hour as he curled contentedly at her feet.

At last came their first public performance. It was before the scanning apparatus and microphones of the visionphone broadcasters and it took United North America by storm. Overnight, Lolita and Miracle became the most talked-of attraction to the jaded pleasure-loving citizenry. They were in immediate demand for the closed-circle theaters where only private performances were given. And it was in these that Miracle found his greatest enjoyment; here he was in the closest contact with mankind, and here Lolita's fondness for him was most manifest.

It was in a closed-circle theater, too, that the event occurred which brought this entire new world of his tumbling about his ears. A fat, bejewcled woman in the front row of seats came hurriedly to the stage immediately after the performance, before the applause had yet subsided.

"Miss Lolita," she puffed. "I want to buy Miracle. I am the wife of the governor of Chicago and can pay any price demanded."

Lolita was a tiny thing of graceful curves and stood but shoulder high to Miracle, who was erect at her side. Her weight was thirty pounds less than his own. But the vigor with which she hugged him left him momentarily breathless.

"He is not for sale," she said stoutly.

But the fat dowager was not to be put off. "I've heard," she said coolly, "that you have only leased Miracle from Rosso. I shall go to see him about this."

Then she swept majestically from the stage and Lolita was crying against the satin lapels of the coat which covered Miracle's breast. The curtain dropped before them.

Rosso called on Lolita the following day. "I've an offer of three million for Miracle," he told her bluntly.

"You can't have him, not until my year is up at any rate. Don't forget I have a contract."

Rosso smiled in a superior manner. "Read it," he said. "You'll find a clause which permits me to cancel the agreement in the event of an offer of more than two million for him."

Lolita's smooth shoulders drooped. She recalled having read the clause but not considering it seriously at the time. The figures had seemed too fantastic.

"But, Rosso," she begged, "your split on the act is running three thousand a week already. It'll be more. Please let me keep him."

"I need immediate credit. Shall I take him with me or must I use force?"

The young actress was on the floor then with her white arms encircling Miracle's head. "You'll have to sue," she said defiantly. "And don't try any rough stuff either. Miracle would tear you apart."

In substantiation of her words, the erstwhile prowler rose up stiff-legged, raising Lolita to her feet with his quick movement. Rosso backed away in alarm.

"You win," he sputtered. "But not for long, Lolita. In less than twenty-four hours I'll have a court order for his surrender, and I'll bring the sheriff here. The robot police, too."

He slammed the door as he went out.

"We'll run away," the girl cried into the thick yellow fur back of Miracle's left ear. "To-night. I'll get out my private air cab and we'll go to South America. I'm a citizen there anyway and he'll not be able to extradite us."

Miracle trembled with the intensity of his emotion. He nuzzled the bright head that lay against his own and wished more than ever for the gift of speech.

THEY spent most of the remaining hours before dinner romping in the gymnasium, Lolita saying she was too nervous and upset to read. Miracle was more than content. The slim flashing figure in silken tights had never been more an object of adoration than it was to-day

When darkness came, they were on the rooftops of the throbbing city. No one saw them when they took off in Lolita's air cab, or at least no one of whom they were aware. But not more than an hour of their southwestward flight had been covered when Lolita's visionphone shrilled its call. They were being followed.

"Shall I answer?" quavered the girl.

Miracle nodded, with a sinking feeling at the pit of his stomach.

It was Phil Strawn whose image flashed into view. The man's face was pinched with anxiety. "Lolita," he husked. "I've left Rosso and want to be with you. Will you have me?"

Miracle observed the flush that covered the girl's cheeks, and the trembling of her fingers on the controls.

"We're over the wastelands," she objected.

"I'm right behind you in my own cab," came the answer. "Just you land down there and I'll follow to pick you up."

Miracle made no move as the little ship nosed down toward the wilds that now were so alien to him. He made no move when the door of the cab opened a little later and Strawn stepped in to take the seat beside Lolita. He did not move until the man had enfolded her willing form in his arms.

Then the prowler slipped stealthily out through the door and into the night. He knew in one devastating instant that his adoration of his goddess was depriving her of the luxurious life she had enjoyed; that her fondness for him was taking her away from her friends. An impossible situation. He was, after all, only the prowler of the wastelands. To the wastelands he must return.

The habitations of man were not for him. His instincts and desires and qualities would only get him into trouble there. And the gift of speech which he had so greatly desired would only make his own life in man's domain one of deeper dissatisfaction. He was an anachronism, a creature apart from all others. So be it, then.

He padded off through the darkness and did not once look back until he had put a safe distance between himself and the two tiny ships of the air. When he did risk a backward glance he dimly saw the cabs where he had left them. He visioned Lolita in Strawn's embrace and for a moment ached with the human emotion of jealousy. Then a better quality with which he had been artificially endowed came to his rescue. A sense of satisfaction stole over him as confidence came that Lolita would now be happy. In Strawn's love she'd soon forget her sympathetic fondness for a yellow cat.

The prowler raised his eyes to the heavens where the streaking lights of stratosphere planes high in the upper lanes mingled with the brilliant flickering points of the stars. The distant baying of a pack of wild dogs brought him to his feet and sent him loping off into the far reaches of the wastelands.

CONCLUDING:

The Mightiest Machine

by John W. Campbell, Jr.

XVII.

THAT IDEA is interesting—you have a notion it acts something like the hæmoglobin of the blood then—carries combined nitrogen to oxygen, is freed of the nitrogen by the oxygen, and immediately goes back for more nitrogen in some way?" Carlisle seemed to turn the idea over in his mind. "Interesting thought—but the thing is, titanium wouldn't do that—it's just against all chemistry."

"Uhmmm—so's this blinkin' catalyst. You haven't made any better suggestions, I take it. Now what would stop it, if that's the case? You know—something like carbon monoxide in the blood Combines with the hæmoglobin and stays that way."

"The chloride is a liquid. And peculiarly stable. The flouride is a solid—I've tried all those things—all the gases I could think of."

"Well, try some more. Try something like ClO_2—a compound of chlorine for instance, with oxygen, so while the oxygen of the compound grabs the nitrogen, the chlorine can slip in."

"This isn't a game of puss in the corner," objected Carlisle. "But I get your idea—I think I'll try something on that idea. But it will have to be an oxy-compound, because nothing else can exist—out there!"

"How goes it now?" asked Aarn, looking in once more at Carlisle's lab. "Any luck?"

"Shut up and keep out—I'm busy." Aarn retired.

It was the twenty-third day when Carlisle came out. The air in the city was unbreathably thin. The oxygen content was so low that people were gasping for breath under the slightest exertion, many of the older, those with weak hearts or lungs, had already gone into eternal sleep.

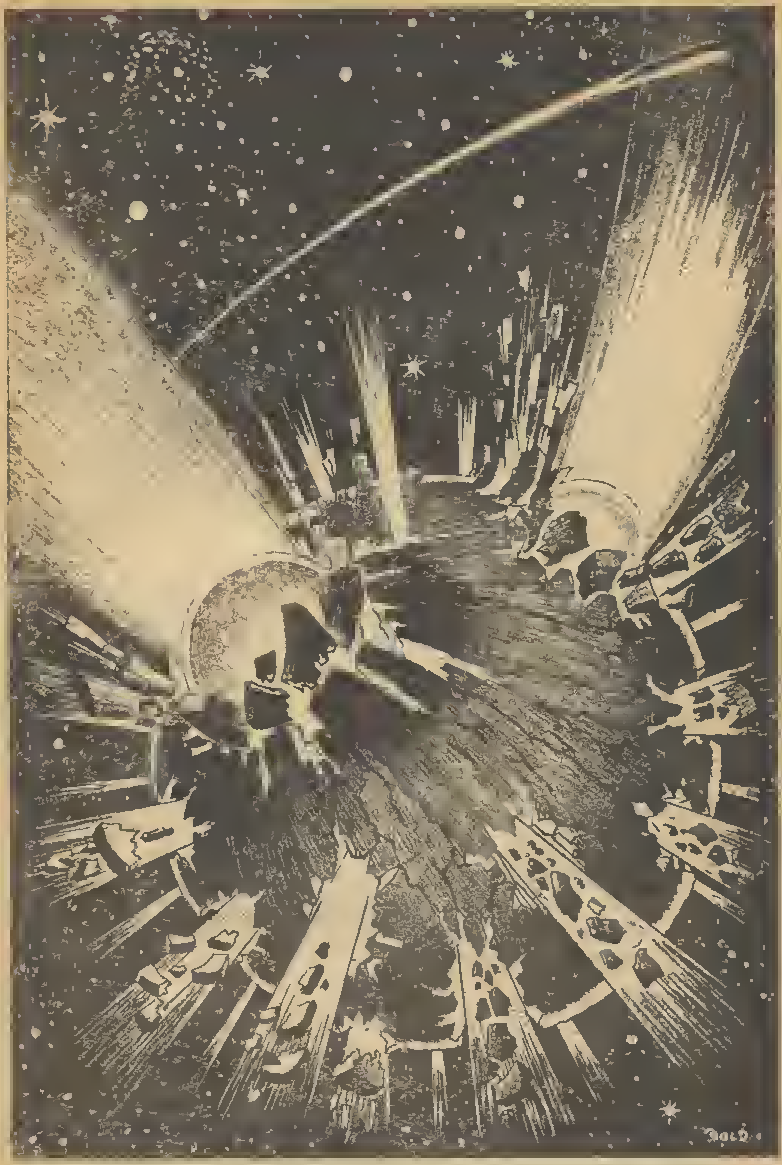
But Aarn recognized Carlisle's joy as he came out. "I've got something—it worked a little——" It was a sealed glass tube, a peculiar greenish-yellow liquid that had the characteristic color of substances green by transmitted and yellow by reflected light. It was volatile, thin liquid, and Carlisle was volatile to-day.

"Come—look——" Aarn was already beside him. The laboratory door shut, and the air inside was noticeably richer, the oxygen content higher.

In the glass dome, there was a little pile of the deadly white nitrogen snow, and a steady blue glow, where oxygen and nitrogen fed into it. Carlisle broke the stem of his sealed tube, and a pungent, biting odor spread through the room. The liquid boiled instantly, and frost collected on the tube. Carlisle held it in a cloth now, as the gas was sucked into the bell jar

Instantly the blue flame died, and went out. It flashed momentarily, and went out. Carlisle resealed his tube in a flame, and no amount of shaking revived the catalystic action.

"I've heated it; I've separated the N_2O_5 and I've done everything else.



With a crash that burst the universe into tortured bedlam, they struck; twin comets which cracked and shattered a planet!

The catalyst is dead—and stays that way!"

"Can we make that?" demanded Aarn.

"We've got to," answered Carlisle. "And we can. It takes—I don't know how little. It's the poison. It's a chlorine compound—you were right. My Lord, the thing—it's done! We—we can live here!"

"Shut up!" snapped Aarn. The man was nearly hysterical from the release of strain. "Get to work and teach the other chemists. We need tons of it—we've got to open those filters first—let the poisonous air come in, and take that catalyst out. Is the anticatalyst poisonous?"

"No—see." Carlisle took a deep breath of the fumes. "It's biting—acrid—a heavy dose might be, but only as hydrochloric acid is. It burns a bit, but in the low concentration. Send all the men up—I've got the poison!"

Hours later flasks of the stuff were coming out. A thin, volatile liquid. Chemists were regulating the flow into the great air filters of the city. In every city similar scenes were being witnessed. The catalyst was no longer deadly. The air could be sucked in more rapidly, the poisons eliminated——

Hours later still—great retorts set up—glass chambers with their loads of deadly snow were being cooked, and plentiful, rich air came out——

Three days—the gas was boiling out of great tanks now, being dropped from low-flying machines, and high-flying machines, and everywhere the catalyst sucked it in—and died.

The flame of deadly blue died, and the nitric oxide at last began to cease its constant fall. Little light flakes drifted down for days, as slow release of the catalyst poison found the last active trace of catalyst.

ALREADY HUGE beam stations had been set up, and great sunbeams reached out to tap the main beam, and hour after hour, great fan arcs reached out across the ground, and the burning arcs caught the snow, converted it in an instant to vapor at thousands of degrees—and smashed the snow back to pure oxygen and nitrogen, the lesser oxides of nitrogen breaking down instantly in the arc. Other stations were being built by the sides of the lakes, by the oceans, at the mouths of rivers. The thick, oily rivers, loaded with the terrible, burning stuff flashed into clean, burning electric flame, and the nitric gases returned to the air as nitrogen and oxygen.

In the cities, life was easy once more, air plentiful, and the outside air pressure rapidly rising. It would be years, perhaps, before the last of the terrible nitric oxide was gone, before men could venture forth unprotected into——

Rains were falling again now. After a brief three days the terrific arcs that boiled away seas and lakes and rivers were throwing rain clouds into the air, and rain began to wash the stuff in thick torrents to the sea, clearing the land rapidly.

The water was loaded with thousands of tons of soluble stuff. Landslides, even minor quakes, changed the topography as the terrific erosive actions became evident. In mere days, the erosion of centuries had taken place!

But it would be years before the soil was fit to bear again, centuries before the seas had been freed of their deadly load of acid. For, active as nitric acid is, and unstable as its compounds are, there were billions on billions of tons of it.

"It will be a generation," said Carlisle, "before the land will be fertile again. Then it will be superfertile, for the place is soaked in nitrates as no other land ever was. The Tefflans have solved the problem of nitrates for all time to come. By the way—when it no

longer counted, I found a way to analyze that blamed stuff, and succeeded in making some. Did you hear what was done with it?"

"No, I've been busy with Spence, setting up arc stations to destroy the stuff."

"A load of it was dumped on Teff-el, just on chance. They had the destructive catalyst, of course—they wouldn't have dared to use the thing as a weapon if they hadn't, and the scout brought back a sample of their anticatalyst By the time he got it here, it was just a mixture of elements Their anticatalyst breaks down so rapidly it couldn't have been analyzed, if we had tried the trick sooner."

"I expected that, too," said Aarn. "I thought of dumping a load of the snow—infected snow I might call it—on Teff-el, to see what they'd do"

"Yes—so did I. But I realized that they'd either let the small amount we had go, or gather it up, and treat it privately. The one thing they wouldn't do would be let us get a sample of that anticatalyst."

"The work on the moons has been deserted temporarily, and our investigators on Teff-el report that their investigators on Magya report a cessation of the efforts to make the moons habitable to their people, so we aren't sorry. In other words, they really thought we were going to move to the moons. The cities will have to be kept closed because of the bad gases outside, anyway, so that there will be no trouble with their investigators getting in and reporting on how the people in our cities feel."

XVIII.

THE GREAT cubicle space was huge, yet packed with apparatus. It was almost one thousand feet on a side, a billion cubic feet of space, yet the great storage coils banked up and away, solid, on all sides of the tiny control and living quarters in the lower corner of the room. The apparatus and labor expended in the construction of this great thing represented the equal of nearly 600,000,000 dollars. A similar enormous sum had been needed for the apparatus—and only part of the labor in constructing the huge power chamber in the heart of Ma-kanee. But nearly 100,000,000 dollars' worth of metal had been extracted, which made the cost of the two just about equal.

If this venture failed, Magya would be hard put for some time Many necessary industries on the home planet had suffered not only from the men diverted here, but the nitric acid inundation had naturally been costly beyond estimation.

Aarn, Spencer and Carlisle stood on a platform high among these great-heaped coil masses and looked down in wonder. "All charged?" asked Spencer at length.

"Filled completely," nodded Aarn. "Remember, the new power message went down to the Sun and back while we were working on this. By the time that flood got here, we had use for it, and it's been filling coils at the rate of two an hour, both here and on Ma-kanee. Both moons' coils are full."

"Really—the destructive energy that will blast—a full-sized planet—is concentrated now in those coils." Carlisle looked at the vast array of coils in something approaching horror. "What would happen if they all released their energy at once?"

"Volatilize this moon Do the same for Ma-kanee, I guess," replied Aarn. "They won't, though. We took certain precautions, I assure you. Though they will be short-circuited at the last final plunge, when the moon strikes Teff-ran. Ma-kanee's coils will go when it strikes Teff-el. But you see not only all the energy stored here—which is enough in itself—but also the energy of falling through five hundred million miles of Anrel's enormous gravitational field, plus the natural orbital velocities of both

Magya system and the individual moon will aid Ma-kanee, our main weapon. Ma-ran here, will be slowed up, and under better control, because it has other duties to perform!"

A sudden dull humming note sounded twice. Carlisle started, and the other two stiffened. "First waroing," said Aarn softly, relaxing. "That's the warning from the astronomers on Ma-kanee. They sent the first waroing, and they'll begin accelerating now, in about thirty-two and a half minutes. They're starting the oscillator tubes, warming them up."

Unconsciously Aarn looked down. Two enormous glass tanks loomed thirty feet high, two tanks filled with metal plates, and huge heaters, grids and screens—the oscillator control tubes. Beside them loomed two cold tubes with a sprinkling of mercury over them about ten feet high, and some five in diameter. They were the "chopper" tubes, tubes which were designated to chop the current off abruptly at an enormous frequency——

AGAIN the two dull humming notes. "The choppers!" said Aarn softly. His eyes shifted to the great bulking lumps of the momentum drive itself. "That comes next—run direct current through them for a while to warm them. Then when they break that current the oscillation is started——"

Three notes. "Let's go below." Aarn lead the way down. In the control room there was quiet confusion. Men were rapidly walking back and forth. Seven different radio positions were occupied Three more television control positions, and finally the great panel where the main controls were, with the three television screens and the selector dials which would throw any part of space on the screen, or into any one of the telescopes.

A low, powerful, throbbing hum sounded. As Aarn threw a switch, the television disk before him lighted up suddenly, as the beating note ceased, and the face of the controller on Ma-kanee appeared. His face was drawn and intent as he threw a switch. Suddenly an enormous cat began to whine, its whine mounted, and steadied to a great gentle pur. Another—another—another——

"Gyroscopes," said Aarn "They have to stop the spin of the moon first. They have small momentum controls that are controlled by the big gyroscopes. They'll hold it firm."

There was a steady grumbling roar sounding now from the speaker. Ma-kanee was being stopped in her age-long rotation. Only slight disturbance was caused, because every particle was being decelerated, but there was a certain amount of oblateness, and this was flattening out, or rounding out, with groaning protest.

The controller started, and turned to some one behind and to one side of him. "All proceeding as directed. The main tubes and apparatus are warm now, ready for operation if necessary."

The man behind him made some inaudible answer, and the controller, Hirun Theralt, checked all the dials before him.

Quickly the time passed. All the men on Ma-kanee were busy, working frantically as the moment of the start approached. Finally the controller spoke directly into his microphone.

"To the Council of Astronomy: My rotation shows zero. Is this correct?"

A voice answered metallically from a concealed speaker. "That is correct. Read off your coordinates, and we will give you the correct axes."

"X-543-27. Y-732-45. Z-982.38."

"Set the controllers at: X-234-31, Y-135-52, Z-64-32. Let the master controls rest at this, and watch only your deviation axes readings. Keep these as directed in further messages. Are they now reading zero?"

"They are zero, and are holding. The automatic antirotation apparatus has been attached, and standardized."

"Continue as instructed, with acceleration along X at the rate of 752,000 units. At the second signal, increase to 1,435,000 units, and continue except as directed."

The controller repeated the instructions, his voice trembling a trifle.

Minutes dragged. Then finally came a soft buzz. Another, another—— "At the tenth," said Aarn softly, "he will start——"

Eight—nine—ten—— A groan echoed softly from the loud speaker, and a great snarling vibration echoed instantly, and died in a shrillness. A blue light glowed down from above, where the great mercury tube boiled into sudden activity.

"Acceleration at seven-five-two," said the controller.

"That means," explained Aarn, "seven hundred and fifty thousand million tons of force. The plan to increase it by steps——"

On the screen, a sudden blankness came, a shift, then the image of an elderly, gray-haired man. "The view we will send now, is a model map of the actual, and the correct theoretical position of Ma-kanee. This will show the deviation from her normal orbit."

The screen was black, save for a green circle, Magya, two red and two blue dots. The dots were points on great ellipses. Slowly, slowly, they could see the red dot near Magya creeping along. The others seemed almost motionless.

Hours later, the inner red dot had made a complete circuit, and now there were three red dots, and two blue. Ma-kanee's dot had split in two. One of the Ma-kanee dots was slowly circling out on a greater, and ever-growing orbit. More and more power was being applied. The slow acceleration was increasing gradually.

Again Ma-ran swung about in her orbit—and now Ma-kanee was hundreds and thousands of miles from her assigned orbit. She was struggling mightily now, with increasing momentum and centrifugal force to pull herself free of the bonds of Magya. Her orbit was lengthening more and more toward a straight line. She was on the night side of Magya now, soon she would fly off on the day side—and escape toward Anrel. Then the acceleration that was being applied would change in direction, change to bend the normal orbital speed about Anrel toward the sun, instead of at right angles. The centrifugal force no longer acting against it, Anrel's pull might drag the moon even faster toward Teff-el.

The screen was showing many different scenes now. At length it showed a scene that was relayed from a ship far away—a ship hanging off Teff-el! An investigator, one of those that still had not been found, was showing the streets of Cantak.

Teff-el had seen and understood, when Ma-kanee started her movement. Not fully understood, for they believed it only a great weapon—a great battleship that no battleship could fight. A battleship that would come down and ray them out of existence—destroy every ship, every orbital fort—and finally the forts on Teff-ran. Then Ma-kanee, they feared, would set up in an orbit about Teff-el, and never again would a Teffian ship be able to reach the surface! Every city isolated—till tunnels could be dug to connect them!

There was panic, and excitement. Tremendous loads of supplies were being rushed out to Teff-ran, that she might defend the planet, perhaps conquer even the mobile moon!

AARN SMILED grimly. "Futile," he said. "Nothing could help. They might carry some of their people away—but the Magyan fleet is already wait-

ing just off Teff-el. They can't get away. There are almost no ships near here."

"What if the Tefflans attack?" asked Carlisle.

Aarn lighted a cigarette carefully. There were few left now. "If they did, what would they attack? The moon? Much good that would do them. Magya? Where? How? There's nothing on the surface, and they couldn't reach the cities before our fleet could start in on one of their orbital forts, and start cleaning up thoroughly. They'd have to be called home."

It took days, and long before the process was finished, Tefflan ships of war were circling viciously off Ma-kanee—and occasionally there was a flash of instantaneous blue incandescence as the inconceivable coils of the moon ship were shorted by a mere cruiser.

But finally Ma-kanee sailed proudly free, and bent her orbit more and more toward Teff-el.

And then, one day, there was further stirring among Magya's children, and Teff-el was stricken by horrible panic.

Aarn, his iron nerves alone subduing the trembling that crept into them, pressed a series of controls. And huge oscillator tubes glowed dull-red. The power board sprang into life across the way, and Aarn read its warnings and its story, and returned to his own control board.

The tremendous transformers hummed suddenly, and the great chopper tubes glowed green-blue, great arcs roared as tumbler switches snapped across. Then the shrill snarl of speeding gyroscopes. The enormous power plant that was Ma-ran, was waking to life. Huge cables that spread out like the threads of a three-dimensional spider web began to glow softly as a low power oscillated through them, and gently, but swiftly, the spin of Ma-ran was slowed There were no observatories outside here. Ma-ran was to be far more active and far more destructive than her larger sister as she ran amuck.

On Ma-kanee, observatories had been dismounted. There were no more machines, no lenses—only the transpon-projectors that bit into the feeble attacking moths of the cruisers. The apparatus had been carried away, and already, as the great coils were exhausted, in accelerating the ship that was a world, they were being recharged again. Then, when these were again discharged, the great supply ships would take them on. Before Ma-kanee finally struck, Teff-el would be little more than a hollow moon. The machinery would be salvaged. But Ma-ran was to be an active deadly thing all her short life as a ship; there would be no salvaging of machinery here. Every coil was to be emptied not once, not twice, but four times.

And as the final signal came, Aarn was on his own. He had only a ship. Carefully he had worked out the course he wanted to follow, and now, with his enormous craft, he turned in the tremendous power. A shrill whine built up, the moon trembled and chattered with the fall of rocks outside, loose material suddenly sliding as the planetoid trembled, started—and moved!

XIX.

"WE'RE on the right course," sighed Aarn after checking his readings once more. "This ship isn't exactly responsive. But—good Lord, what power!" He looked up through the glass roof of the power room to the gigantic glowing platinum bars that represented the filament heaters of the oscillator tubes. Beyond rose tier on tier of great coils. Men were working among them now, weightless, for the gravity had been turned off. The coils, rapidly being shifted from one transpon

beam set-up to the other, were being prepared for the first charging. A transpon beam would soon reach out across space to tap tbe great permanent beam structure that was now several million miles away. A recharge was needed. Ma-ran had just escaped the gravity of Magya.

Aarn looked through a tiny cross-hair instrument at an exceedingly sensitive and accurate television device—and saw he was exactly on his course, according to the stars of this space.

He straightened again, and flipped a televisor control. The screen before him swirled, and lighted up with the seene aboard the Ma-kanee. The controller on duty now was again Hirun Theralt. He looked up witb a smile "You are on course, and all is going well?"

"Perfectly We are only about 3,000,000 miles behind you now. We'll be passing in a few days. They been bothering you much?"

Hirun Theralt smiled woodenly. "Slightly," he acknowledged. "We have destroyed fifteen cruisers, ten destroyers—and scout ships by the score! They have stopped annoying. And you?"

"We aren't fighting at all—we found that tbe disintegrators can't get through all the rock and stuff So we're just not noticing them Several of them getting ready to land have been destroyed by a transpon beam, though. We forbid landing."

"They're taking out our coils. They've been discharged completely."

"Aye—I saw the supply ships coming. You have no control left?"

"We are maintaining control only by means of the battleships, remember."

"They won't salvage this apparatus," Aarn said rather sadly. "They can't really use the power plant anyway—nothing else this big to move."

Hirun Theralt laughed, and Aarn suddenly started, as he saw Anto Rayl appear in his screen, smiling, too. "Don't be so sure! We are thinking seriously of going after some of those minor planetoids out beyond there, and hauling them in whole for moons—and metal."

"Not too bad an idea—hi—two battleships!" Aarn started in surprise, as, on his side screen, two Tefflan battleships appeared suddenly swooping down. A faint tingling stirred in Aarn's flesh, a lethargy, that was yet mixed with a strong, tearing stimulus——

"The death ray!" he called in surprise. "They have power in that——" He was working swiftly. About him, as he had sounded the alarm, a dozen other men had appeared as if by magic, and a tremendous activity of switches and power boards took place.

"Defense power in," snapped a young Magyan power lieutenant

"Propulsive power doubled," another called, as he finished his work.

"Turn the sun-tapper beam up, for full drain available, and prepare to turn it into a waste beam if necessary," snapped Aarn, going to work. Even to this enormous thing, a battleship attacking with death-dance rays, could be deadly.

The battleships came rapidly, swooping nearer. Aarn turned four huge transpon beams on the first ship, and, when he was sure his sighting devices had had time to keep them aligned, he sent out all the power they could safely carry.

One—two—three—they struck. An enormous, scintillating splotch of light exploded suddenly on the walls of the first battleship—it flared and grew to a terrible, blinding sun, a spot of light ten feet across, with a billion horse power pounding against it! But the wall of the ship did not yield! Aarn started in surprise—and at that moment the greater sun-tapping beam power came in. The spot of light spread like an eating acid, flared to an incredible temperature, the metal behind that light——

"They've stopped it," Aarn groaned. "A sheath of some sort of transpon condition. I knew they'd analyze it eventually."

"What does that mean?" snapped Spencer.

"The transpon beam is useless! They can——" As he spoke, the moon tingled to a terrific shock of the death beam.

Aarn turned his face up slowly, and it twitched with the shock of the beam. "—absorb power from us," he finished. He pulled a dozen switches, and the transpon beams died, only the coils drank in the power now. "Without that supply of power, they can't kill us with this mass of material in the way of their high-frequency note."

ALREADY from far across space, Magyan battleships were appearing, here and there a ship materialized suddenly from nothingness, slowing to speed less than that of light. Battleships racing to the call of the Ma-ran. The warning had gone out by radio—but on the surface of Ma-ran there were scout stations, where scout ships capable of exceeding light speed lay constantly ready. With the first sight of the battleships, they had started. Those who had remained on the outside of Ma-ran had died when the beam struck.

The Tefflan battleships turned, and with their terrible destructive beams started work on the Magyan fleet. Their beams were far more powerful, the center of their great ships hollow, letting the gravity bombs explode harmlessly. The magnetic bombs were useless against that thick metallic armor of the battleships——

And a Magyan battlesbip slowly, slowly crumbled away. Another began to drift helplessly, as the men within it died—— Thermite bombs were glowing on the great sides of the battleship—and as they ate through, the Magyans saw within a three-foot layer of the red-gold. It carried away the thermite's heat so rapidly that no break was made.

"They came prepared," murmured Aarn gently. Spencer looked at him in wonder. Aarn had a plan, evidently. "But there are limits—limits in everything. Now I wonder——" Aarn grew busy with the televisor, making strange gargling noises, thinking carefully and painfully before each.

"Code," he said, as Spencer looked at him with troubled eyes. "Not a language. They know what I mean though when——"

Presently Aarn was setting up a great many beam circuits, and far across space, a great many other men were working very hard. They were men on Ma-kanee, and on the supply ships, and elsewhere——

"Spence," said Aarn, "if you think you have seen heat, or seen power—just you reconsider."

Presently, Aarn was ready, and he growled and gargled something else. Ten seconds later, his eyes glued on a superaccurate chronometer, he pressed a button. Then he looked eagerly at the screen. Great transpon beams had reached out in tbree directions, and simultaneously, the whole great coil system of Ma-ran, the great tapping beam that was reaching out to the main tapping beam that extended from Magya to Anrel—all were in the circuit.

And, in the middle of space, close to the point where the two Tefflan ships fought end to end, it happened. The aiming was very accurate. The great power coils of the supply ship near Ma-kanee, the remaining power coils of Ma-kanee, the power coils of six Magyan battleships—all were pouring their power into a single beam. And the combined might of the tapping beam, and Ma-ran's coils against it!

Then, while the Magyan fleet retreated, a Magyan scout ship was started for that energy center—and reached it at just the moment it came

While they watched it happened. Three rays of such power as man had never seen came together, and the heat annihilated!

into being. There were no men in the ship, and the ship flashed into instantaneous gas, and gas at such a temperature that the thermite had been cold by comparison. The molecules were split to atoms, and the atoms smashed to electrons and protons and negatrons and neutrons—and they exploded outward with something approaching the speed of light. And the wasted energy became radiant energy, and anything anywhere near that energy center was heated by it.

Not the mild warmth of a thermite bomb—located in a spot—but the heat such as a minor sun might give. Billions of horse power. Not a heat ray, but a wild, uncontrolled heat center.

The Tefflans were suddenly glowing white at the end nearest the center. The heat spread, and even as the ships started, the rear sections slumped molten, and floated away, blazing white and blue in the heat of the center. The fore sections, no longer shadowed, unable to accelerate into a speed faster than light, and escape, as the nearer Magyan ships had, turned red, and smoked——

They fell easy prey to a few hundred gravity bombs, for the center of the ship was not the center of half the ship. And the transpon-condition shield failed, and the battleships became, in short seconds, flaming incandescent wreckage.

Slowly, the heat center died, as the conflicting powers were withdrawn gradually, lest some ship be injured by an unchecked beam.

Aarn smiled slightly to Spencer. "I hope they haven't any more like that. I hear that they destroyed seven of our ships before they got out here——"

"They haven't, I suspect, or they'd have sent them all. They were afraid of this moon."

XX.

"I THINK our course will be X-235-89," Aarn said. His voice was low, and tense. Ma-kanee was thousands of miles behind now—but in the forward televisor disk, Teff-el showed a huge, round disk. And about the little moon, traveling now with a velocity of thousands of miles an hour, but slower now than Ma-kanee, a fleet of great battleships wove a constant pattern. An angry, threatening halo of destruction, strengthened and widened by the heavy cruisers, and light cruisers, and destroyers. Almost the entire navy was here, for Ma-kanee needed no protection now. Ma-kanee was deserted. There was no apparatus, save for two or three televisors, and a small crew of men to observe. Ma-kanee was a hollow hulk, seven hundred miles in diameter, driving down on a doomed world

Teff-el was under no delusions now. They knew that Ma-kanee was not intended to capture forts, and their moon—they knew what it meant. And that was the reason for the heavy protection that was offered Ma-ran. The Tefflans knew that Ma-kanee had no driving engine, that they had no possible weapon capable of turning it. Their only hope lay in capturing Ma-ran, and using it to batter Ma-kanee aside.

The buzz saw of circling, deadly ships was not revolving unhindered. Scout ships of the Tefflan fleet kept darting in, hoping to launch an unsuspected torpedo, or some weapon which might pierce the magnetic and antigravity shields.

Then the thing happened which the Magyans had been expecting. The Tefflan commercial fleets swam up from their cities, formed with incredible speed, and swept out into space. They went directly away from the approaching moons, out from Teff-el in such a direction that the battleships of Magya would have to circle wide around the planet to attack them, for the great forts were still in action. Instantly the fleet about Ma-ran split, according to previous orders. The newest, fastest ships disappeared in speed greater than

light. On the other side of Teff-el, the fleet of thousands of ships had split, scattered in every direction.

This was not merely a migration—it was an attempt at escape, an attempt filled with hatred, and bitterness——

"If only," said Miuut Kakin, "we can have but one shipload of the colonists safely through—safely on that planet, Tieranl—they can establish a secret colony—we will yet have some chance of wiping out those misconceived Magyans!"

Miuut Kakin was in charge of the Tefflan escape. He himself would not go He would die—with most of the planet's inhabitants.

And just about five thousand miles beyond Teff-ran's orbit, the fleet of fleeing Tefflans learned that Magya had yet one more weapon—a detector. Bombs. Bombs less than a half inch in diameter, bombs projected by the millions, from great momentum-wave guns, so that they traveled at a velocity of fifty miles a second—like the spreading pellets from a shot gun—bombs of luminous paint. They scattered in every direction in space. Meteors suddenly became luminescent. Ships, fleeing, lightless ships were suddenly visible——

With the joy bred of warfare, hatred incredibly old, the Magyan battleships threw themselves on their prey. The needle ships of Teff-el strove in vain to disintegrate the great machines. Their own walls, only inches in thickness. flashed in instantaneous incandescence as two great transpon beams touched either end, and the shock of enormous antigravity power coils poured through the framework

They did not find some battleships. But they released nearly two thousand tiny one-man spy ships to dart about the space, and seek out every ship, every possible machine, and destroyers lingered behind to finish the job.

"This time," said Argan Matroh, Coördinator of Councils, "there shall not be even one ship to maintain that race" The battleships and the spy ships and the destroyers worked to that end.

But when hundreds of ships start out, all at one time, one, just one, might escape. There would be a careful search of every planet after this, just for certainty.

Aarn watched the screen ahead. There were other ships still on Teff-el, ships never designed to leave the planet, and incapable of it. They were scurrying madly back and forth. The ships were visible in the telescopic televisor.

"Orbital fort," said Spencer, pointing to a sudden, unfocused black shadow that swam leisurely across the view "Will they be dangerous?"

Aarn shrugged his shoulders. "Probably. They may be able to reach us with the new death-ray projectors. We will know sooner or later."

"Two hours and thirty-one minutes," said Spencer.

The planet was growing rapidly now. Far off to the left loomed Teff-ran, sweeping rapidly nearer. Teff-ran would not cross their path in this first circuit. "I hope they calculated the mass of those orbital forts right," sighed Aarn. "It will ruin our plans if they don't give the right reaction."

"How?"

"We're supposed to hit three of them in this first swing, five in the next—if the thing works We're going above orbital speed. Those collisions, with loss of momentum, or better, increase of mass, are counted on to slow us for an exceedingly elliptical orbit. The five next time, will round out our orbit again, act as a resisting medium—molecules in a supergas to slow us down."

"I've been wondering—won't the shock of the tremendous mass of those forts be enough to split this moon wide open, split it anyway so that the momentum drive won't operate? Or so that the apparatus here is smashed?"

AARN shook his head slowly. "They'll mainly bury themselves in this. We have fifty miles of solid rock above us. A fort—even one as huge as they are—will be of no great consequence. Remember, the rate of collision, the additive velocities, will make the relative velocities practically thirty-five miles a second. The result will be volatilization for the first fort, and for some of our rocky layer, the lower rate of collision of the second, will make it slightly less severe. The main thing, though, is that the rock won't transmit the shock at all!"

"Why not, it certainly isn't dough?"

"No, but—it can't transmit any shock, any push, at speed greater than the speed of sound through it. That speed of collision is greater than the speed of sound. Ergo, it won't be transmitted as a push. It will simply reduce the rock it hits to powder, expend its energy smashing the rock, breaking it, demolishing it—and not on moving."

"Also—why don't those orbital forts get out of the way?" asked Spencer.

"Combination of reasons. They could get part way out of the way at our present speed. That is, they could escape us once, but actually, this moon has greater mobility than they have. They were carried out by supply ships in pieces, and built up. They have motive power enough to turn around, and to straighten out their orbits so they won't tangle, but they can't flee. The main thing is that those Tefflans have courage. They will hope that the greater power of the forts may be able to do something against this moon, in the way of stopping it."

"Well, their new beams will, won't they? If the battleships were dangerous——"

"The forts won't be. For two reasons. There are twenty-two forts, and only two battleships were equipped. You see that point?"

"They'd equip more battleships if they had time to manufacture the apparatus?"

"Yes—those were standard battleships—except for that feature. Anto Rayl says their investigators have found that those ships were two which had been for repairs at the time of the general debacle. They equipped those two, because a battleship can be more dangerous to this moon than a fort, even though a fort has greater power, since we could always reman the blamed thing, if they did kill us off, and the fort which killed us would be so much scrap buried in powdered rock.

"And the second point is—we've set up a heterodyne device that will tend to shift the frequency of those waves up to a higher, and harmless frequency. Harmless, because it is absorbed by their sound-conducting medium, the rock and steel. Provided they don't get too much power through. If they succeed in pounding it through even an absorbing medium, we'll be worse off, because the higher frequency is more quickly fatal."

"Pleasant thought. I wonder——" Twice a soft hum rose and fell musically.

"Carlisle," said Aarn, and flipped up the switch. Carlisle's image appeared slowly on the screen.

"Hello—hello—are you listening? I hope, since your Jupiter-dulled ears match your Jupiter-dulled wits, that you are. I'm about ten seconds away. You are sweeping in on line, and there is considerable anxiety among the forts. They've been trying to calculate your orbit, in at least two of them."

"How do you know that?" snapped Aarn, and went on listening.

"But haven't succeeded, since they can't allow for the effect of the collisions properly. Don't know your mass and all, nor how you will use your power, nor how great your power is. They think they'll be able to escape, most of 'em. They—eh—what? Oh—we learned easily enough. We smug-

gled some very useful investigators aboard. They haven't the new apparatus, by the way, and the Magyans here only mourn that they can't explore the whole fort. These darned things set up such a field, though, they are spotted the instant they move. The ones we're using have been lying still now for nearly thirty-two hours. They came in along with the food supplies. We have some mighty ingenious and daring Magyans to thank for that. My idea of nerve. They made up three or four dozen crates of imitation food supply, and took them down a while ago, and planted them in Cantak, in a depot where a shipment of food for the forts was waiting. Made it and back without being spotted, thanks to the hubbub and general trouble down there, and now the investigators are loose on nearly all the forts." Carlisle paused for breath.

"That's what I call the long-distance nonstop, pollysyllabic, single-word speech," said Aarn, with a grin. "Fade off, I'm about to be busy. When you hear this, you'll know that merry voice of yours has been talking to a dead mike for twelve seconds." Aarn flipped his switch, and looked at the more-important scene ahead.

"They know which one we're headed for," he said, at length. The fort ahead was shifting, shifting distinctly from its cross-hair position. "I'll bet they strain a bed bolt pulling that crate, too."

The cross hairs were inclosed in a little circular target ring. The fort should have centered in that, about now, and they would be entering the range of the fort. Already their escort of powerful ships was falling away on every side, hastening away to leave the run-away moon to its work of attacking the fort.

Immediately a swarm of lesser Tefflan craft shot out from the direction of the fort, and came on directly in a line between fort and moon. Aarn smiled, and made some rapid adjustments.

"Destructive power on station thirty-four," he whispered tenderly into a microphone he picked up. Presently he pressed a button before him, reluctantly it seemed. Twin beams of transpon force reached out straight toward the fort, and Aarn manipulated them skillfully. A tremendous blue-white arc flared at the far end, near the fort, and suddenly that arc was racing toward the Ma-ran. The transpon beams were opening apart like the legs of a divider, and an arc representing billions of horse power raced nearer Ma-ran.

LIKE MOTHS in a flame, the bravely-attacking Tefflan ships exploded into nothing. The one-hundred-mile world, Ma-ran, loose and wandering to attack its foes, trundled solemnly, precisely toward the great fort, nearly five and a half miles in diameter, that loomed ahead.

Spencer, sitting near Aarn, had tuned in another, small television disk, and clearly now the picture inside the Tefflan fort was showing what the investigator within saw. Tefflans were scurrying around in wildest confusion.

"Send out all the torpedoes we have, and about half the heavy bombs. Turn the full power of the disintegrating ray on the surface where we will hit——" To the Tefflan it seemed the fort he was in was falling to the great surface, looming nearer and nearer. "Aggag Keenat, can we escape?"

"No, Master of Forts, there is no slightest possibility," said the astronomer calmly. "It matters little. They would move next to attack Teff-el. In this way, one of those missiles will be shattered, and if the prepared snare works——"

The fort was rapidly assuming the appearance of a disk now. And the torpedoes struck. Hundreds of them. They exploded and bored their way in

through miles of rock. And yet not far enough to do damage. Then great bombs—the force of collision sank them half a mile, before they could ever explode. Then a great section of rock was blasted free.

"The trouble is," said Aarn judiciously, "that there is so little surface gravity here, that a good-sized ant could lift a boulder, and heave it out of the field of this vest-pocket planet."

"Even I admit this gravity is low," nodded Spencer. "Can you—ouch!—that was a bad one—it jarred the whole moon."

"That," said Aarn, watching his screen carefully, "was the 'half the rest of the heavy bombs' he mentioned. They tore off—ah—that's better. They're falling back now." Aarn smiled contentedly. He had been working rapidly, and finally succeeded in getting his artificial gravity field which prevailed inside the planet, to spread outside. It was gripping those broken fragments now, and drawing them slowly back.

Aarn switched on a microphone before him. "Calling the commander of fleets—commander of fleets—please give thought to my suggestion, and request, sir. The enemy is dropping powerful bombs in our path. The bombs break the rock, and will, if long continued, decrease the effectiveness of Ma-ran immeasurably. Suggest that you have a number of destroyers land on the forward side of Ma-ran, so close together that their various magnetic shields overlap, and thus protect the planet against the bombs."

The fort was scarcely a thousand miles away, as Aarn finished. Nearer and nearer it swept—nearer—it expanded like a balloon—swept larger——

Fifteen seconds to go—— "The first—it can't escape, Spence—ten—hold on!" The cry echoed through the speakers—five seconds—— "She comes!"

The titanic mass of a hundred-mile sphere of rock and metal lumbered on—the mighty fort seemed poised, motionless. The flight of the fort was invisibly slow as they approached at thirty-two miles a second. It seemed the moon sprang at the fort, instantly reaching it, in those last few seconds. She seemed to accelerate with tremendous rapidity, decreasing the distance to zero in an instant——

A frightful burst of white-hot flame fanned out. A huge column of gas shot up, blazing white, searing flame heated beyond incandescence by the terrific impact, a gaseous column of steel vapor, thrown out by the electric flame of destroyed accumulators, bursting power plant——

The flame turned blue-green as the mercury flashed suddenly out in a momentary puff——

"The body has penetrated to a depth of ten and a quarter miles," announced a geologist assistant, coming up to Aarn.

"The next fort is now only one and three-quarter minutes away," snapped Aarn. "We've got to have that protective bunch of destroyers—ahhhhhhh listen——"

A continuous prolonged roar echoed and reechoed through the rock. "The snare—I thought so—tons of explosives, and one ton would lift half the rock on this planet clear out of gravitative control without the artificial field until——"

"There is a hole, or completely broken spot in the rock twenty-two miles across, and a mile and a quarter deep," announced the assistant coming up.

"Uhmmm—not as bad as I feared. That isn't going to be a hole, because the artificial gravity field will draw it back. I think—we can let it go."

Again the signal rang out to hold on—again the sudden spread of a gigantic, expanding fort—and the terrible, soul-

wrenching crash. The whole planet jarred slightly to it, and creaked.

"A crack has opened now, due to the close pits of the two forts. The commander of geological forces suggests you rotate the moon slowly——"

Another steel sphere was growing—— Aarn saw that it was escaping them. "He had warning—we'd have hit him well on one side of our surface anyway——"

"We may graze him!"

"I doubt it, so—but I'll see." Rapidly Aarn's fingers flew over the control, and suddenly the great moon's structure creaked to a steady driving force, tremendous transpon beams flared and gleamed through the mighty cavern in its heart.

"He's going faster now!"

"So are we!" said Aarn grimly.

"We'll hit—no—— Yes, by the planets——"

A terrible shrieking, grinding roar, a long-drawn howl of agony through the rocks——

And a fort like a dimpled, dented can rolled off clumsily, swiftly, end over end, and straight toward Teff-el!

"Broke his orbit!" cried Aarn. "He's ruined now, nothing can reform it for him."

"He's ruined anyway, the thing is past any effective work now."

"Don't you believe that, Spence! Those battleships are hard enough to stop, but every fort has sixteen separate power plants, and accumulators spread over the whole thing. There are some men always kept in acceleration-neutralizing apparatus—great spring chambers so arranged that no matter how the sudden acceleration might be applied, some would be sure to be saved. Two old battleship hulks were tied together once, and driven against one of the old forts, and killed off most of the crew. Never again, though. But that fort is done. It will be crushed on Teff-el."

XXI.

"THAT'S the last fort, Carlisle."

"I know it, Aarn. I'm aboard the *Sunbeam* now. Is your entrance still clear?"

"Perfectly. We saw to that. Where's the *Sunbeam?*"

"About ten thousand miles behind. Have you got that orbit checked?"

"Teff-ran is right in our swing—dead center—but they've got those hulks you know——"

"What of it? They can't turn that, can they?"

"Somewhat. They'll slow it down, remember. Our velocity is only about ten miles a second—more than orbital speed, but they will mean something. What are they, exactly?"

"Every big freighter that could climb off Teff-el, loaded with rubbish, rock, scrap steel, ingots, everything heavy they could cram into them. They're still adding to it. Won't it break up the moon? And will they slow you down so much——"

"Whoa—wait. They'll slow us down, but they won't interfere with the plan. Remember, this is our fourth circling. We've acquired the added mass of all those forts. We're distinctly heavier now, so heavy we can scarcely maneuver with the driving equipment we have. Those ships will be swept into us, and add to the mass. We'll lose velocity—but we won't lose momentum. The momentum will be the same, we can leave, and the moon will smash Teff-ran with just enough momentum to stop it dead, if the figures we have are right. Then she'll have to drop on Teff-el."

"Couldn't you dodge that bunch of ships, and get more momentum and velocity so you'd hit Teff-el harder?"

"Ha—vindictive, aren't you? Why knock a planet when it's down-ey powder. The thing will be ruined anyway!"

"All right. What do I do?"

"Slip in that opening. You have your guard?"

"Three battleships."

"All right—ship in. There are only five of us left. We'll be all ready to get into the *Sunbeam*, and leave here just about ten seconds before the smash. They've rigged an outside jury control We'll operate that. I'm putting on a space suit."

"Check—do I come now?"

"Right." Aarn cut the switch, and attended strictly to business. "Got that final detonator rigged, Spence?"

"Right Are we going to leave before Ma-ran hits those ships or after?"

"Before—they aren't like the forts. These are concentrated mass Remember, the forts were ninety per cent open rooms Those cargo boats have been stuffed with everything heavy they could find, then loaded further when they were in place out here. They'll go through so far they may actually reach down here."

"Hmmmm—they may. Everything rigged on your end?"

"Everything. And the *Sunbeam's* in the outer lock already Ten miles a second—check exactly. Leave the autos in control, I guess—till we get above." Aarn rapidly set the controls to respond as he wished, and in a moment they were whirling up in the *Sunbeam*.

Up through the long tunnel, still glowing with the lights. Nearly all the energy was drained from the great coils now, and a great deal of the most valuable apparatus had been salvaged, the instruments in particular. Still, one bank of coils contained its full energy potential, enough to run the mighty driving engine for about ten minutes on full power. Aarn had started that, and the Ma-ran was accelerating now.

The *Sunbeam* rose with some difficulty, the two systems of momentum waves fighting each other in a slight blue, wavering luminescence about the ship. "She's drawing a lot of power," Spencer remarked.

In seconds the ship was out of the tunnel, propelled at the last by a blast of escaping air. Ma-ran was airless now Swiftly the ship raced around the little world, around the incredibly tortured forward side. Immense craters dotted the surface, huge holes, and mighty piles of tumbled rock They landed, and examined the broken stone. Aarn laughed, and picked up one nearly ten feet square, and threw it a quarter of a mile, as he walked toward the little heap of instruments and apparatus glistening in the sunlight. Swiftly he fastened several heavy cables to the *Sunbeam*, then looked at his instruments. The chronometer, the registering velocispectrometer, and the momentumometer were most important.

Then he looked up. Directly overhead floated a maze of dancing, moving points of light, which were slowly, steadily spreading and separating, widening across his sky. And beyond, the disk of Teff-ran, to one side of the greater, shining crescent of Teff-el A swarm of great battleships seemed to be gliding steadily about Ma-ran, and beyond them a greater swarm of smaller ships. Aarn carefully aligned the huge missile he was launching, checked his coordinates carefully, and finally cut off the acceleration he had been using.

Then he pushed a button Quickly now, he pulled a heavy double-handed swordlike ax from its resting place, swung it above his head, and brought it down with all his power on the heavy-armored cables that, wired together, twisted off across the incredible jumble of rocks to the shaft that plunged fifty miles to the center of Ma-ran, and severed it. Instantly, then, he leaped for the entrance of the *Sunbeam* with the instrument panel in his arms. The ship started up as he reached it, the controls he had lately been using dangling on the steel cable as the ship darted swiftly up and away.

Scarcely had they left the surface,

when something began to happen. From the mouth of the great tunnel, gases were still pouring, but now they were suddenly tinged with red, and then greenish white, and they plunged out in an explosive flame.

As the *Sunbeam* swept up, the view Aarn had was, for the first time, as an outsider. The majesty of the scene came to him suddenly—the great dark sphere, rugged and cold in the sunlight, the dust motes of the Tefflan freighters daring to oppose it, and, further away, the great mass of Teff-ran.

And now, away from the moon, he saw at last Ma-kanee. Deserted, uncontrolled, and uncontrollable, she was plunging straight for Teff-el. And Teff-el was already drawing her. Seas on Teff-el were rising, tides appearing, for already the swift-moving moon was within 1,000,000 miles of the planet. There had been no attempts to divert it. That was frankly impossible. Further attempts to escape from Teff-el had been made, but there was a great ring now, of far-flung spy ships, each with a tremendous magnetic atmosphere thrown out, and the first touch of a ship attempting to escape made itself very evident. And the fields overlapped.

MINUTES passed swiftly. And now the mass of Tefflan ships ahead, deserted, had separated to individuals. Minutes more passed, and at last the terrific process that had been going on within Ma-ran became evident. A dull glow began to appear in the rocks below. It was growing swiftly——

The first great Tefflan freighter plowed into Ma-ran. It was swallowed up like a pebble sinking into water—and with the same splashing of liquid. Almost instantly a tremendous fountain of white-hot lava snapped out, a ball of it—and impaled a second freighter that was almost in line with the first. Both tumbled to the mad moon. A dozen were falling—a hundred——

In seconds Ma-ran was sweeping on through a clear space. Every one of the great Tefflan ships had been absorbed. One of them had barely gazed the world, but been caught, and lay a pool of lighter, molten stuff on the rock pool. Great hot bubbles of air were oozing slowly up from the ships.

"Velocity fell only one point. That was good enough. We reach Teff-ran now in three quarters of an hour," said Aarn at last.

The minutes dragged The two great bodies seemed to move with infinite, weary slowness. They seemed to know doom was upon them, and were going to it with the slow steadiness of men who welcomed doom, but accepting it philosophically and without hurry

Further and further the *Sunbeam* and her escort drew away now. She raced ahead to a position in line with the final meeting, and watched as the two great balls of matter moved leisurely toward each other.

Ma-ran looked like an orange drifting gently toward a grapefruit, Ma-ran was at last the smaller as she approached the end of her mad career And beyond the great crescent of Teff-el, and the approaching disk of Ma-kanee. Tefflan ships swarmed up from Teff-ran—and a swarm of heavy Magyan cruisers fell on them instantly and cut them to pieces.

Ma-ran bulged slowly, seemed to lengthen, and hastened her wild pace as she neared Teff-ran. Glowing red with the liberated energy of her coils, she stretched, became a blunt-ended cylinder—and slowly became two great balls of red-hot matter as she began to turn visibly.

"Gyroscopes went—the impact of the ships——" muttered Aarn uneasily. "That may have some unlooked-for effect——"

Soundlessly, softly, with a sudden

increased blaze of light, the two masses met, and spattered. Ma-ran coalesced with Teff-ran, and stopped Teff-ran split. Slowly, majestically, they could see chasms open and run about the world. The sides fell away, and kept on going. The second half of Ma-ran struck, and spread like a drop of melted lead on a hard surface—and the slipping sides of Teff-ran were snared, and melted in the flaming blue-white heat of the collision. In a quarter of an hour both bodies were one, and the mass was white-hot, flames spurting out angrily.

Hours passed, as Aarn hung grimly beside the glowing mass. Finally he was satisfied with his observations, and made his calculations. "Six hours. Ma-kanee will get there in about six hours, two minutes and thirty seconds. This will get there at almost the same time. My calculations aren't quite accurate. I can't allow for the displacement of Teff-el for one thing."

The new mass was dropping Slowly—steadily. Wildly, small ships were shooting up from Teff-el, vindictively heading toward a cruiser or battleship with all its power, hoping to smash through the great wall even as the pilot died. They flamed briefly in a great transpon beam, and died—unsuccessful.

Ma-kanee moved steadily downward. Tefflans were out on the surface of the planet, black masses of them, moving and surging, as they watched the two great bodies falling out of the skies on two exactly opposite sides

Three hours. Four hours Five hours. The heat of the new mass, glowing red, had driven the black masses to other parts of the world. Cracks were appearing in Teff-el now. The new mass was only slightly distorted.

"Teff-el's gravitational field declines slowly in strength—mass is so great—doesn't pull the near side much harder than the far side, so they don't fall apart, as Ma-ran did."

But Teff-el began to fall apart. Great cracks appeared, smoke began to curl up, and over the great cavern system of Cantak, the ground sank suddenly, and an abrupt fault line appeared that sectioned the city with the precision of a knife. And slowly Teff-el turned under the baleful glare of the new, red-hot menace.

Five hours and a half. The red-hot mass was nearing the outer fringes of the atmosphere. It was falling swiftly now, still circling the planet a bit, so that its contact would not be a center blow, but a gouging scrape. An entire fleet of battleships was pulling at it now with traction beams, but there was practically no effect. The mass was too great, the beams almost totally useless.

At the end of six hours, Ma-kanee entered the atmosphere. The atmosphere instantly compressed under it, a great bubble of air, and simultaneously, for the three seconds it took the planet to traverse the atmosphere, everything beneath that place was compressed under a stupendous air pressure It mounted like a solid wave; the air could not move away in time——

Ma-ran-teff-ran struck the other side. The atmosphere flamed below, and the planets caught fire from the terrible, glowing coal Almost simultaneously, with a precision that was astounding, two bodies struck Teff-el.

And the planet burst like a rotten tomato. Spurts of liquid stuff shot suddenly out of mighty chasms. Bursts that were cold, and solidified instantaneously into weird shafts of solid, grainless, incredible rock. Jets of rock, then great sections of rock, then a great jet of flying, gleaming metal, that squirted out like water from a hose, and solidified as the rock had, and stood out in a bar ten miles through and a hundred and fifty long

And then only parts, and broken splinters that began to stop flying apart remained. They were glowing, and

some of them struck, and stuck together, and the force of their striking made them glow more, and cemented them. All three bodies were utterly destroyed, but the heat of Ma-ran-teff-ran remained, and seemed to act as a binding agent

"Well—the ancient enemy is gone. Destroyed after some forty thousand years of trying."

"And Teff-el is destroyed."

"But while Tefflans can never reform, Teff-el is already reforming. See how the parts are falling together. It will be centuries, millenniums, before it is a planet again. But Teff-el is not destroyed. An incident in its life has taken place." Aarn gazed at the planet's reintegrating parts.

EPILOGUE.

"THE apparatus is installed, Anto Rayl, the problem has been solved, and we have left apparatus with you. We must go now. Our home is on the other side of the wall, but we can both climb that wall now—so we of Earth will expect to see you of Magya soon. You will come?"

"Certainly we will come, Aarn Munro. We will want to see the Ancient World, where men such as those we have met are bred, and where the race was born."

"We do not like to see you go. We wish you could stay, but we realize your situation. We will attempt to follow you through at the end of one thousand days."

"So—till then." Anto Rayl, standing in the airlock of the *Sunbeam* waved, turned, and dived across space to the entrance port of a great gleaming metal wall, a mighty battleship wall.

"They won't need those any more," said Aarn thoughtfully, and set up his controls.

Anto Rayl looked back—and saw suddenly that the *Spencer Research Laboratories Number Six* was going. Going off with infinite speed into infinite distance, or into infinite smallness. He couldn't tell which——

THE END

LIFE CURRENT

Of what happened in the laboratory when a man speeded the life current in his veins.

by
DONALD
WANDREI

A WILD wind whooped and tore at her as she turned the corner. She hugged her coat closer, nestling her face in the fur of its collar. As she struggled against the gale, she envied the people going in the opposite direction. Half blown along, they hurried toward her with the wind at their back. She had to face it, and it sliced through her coat with the zero cold of a winter night.

Marjorie might have taken a taxi, but it hadn't seemed worth while for the few blocks between the apartment and the Power Research Laboratories where Langston spent most of his time She ruefully shook her head in answer to a taxi that slowed hopefully and *beeped* inquisitively at the curb. A flurry of snow pelted her as she crossed under the "L," but having come two-thirds of the way, she decided she might as well walk the last couple of blocks.

Besides, she had no urgent reason for being out, and no real reason for visiting the laboratory—except Langston and a hunch. Langston often worked late and had been away many evenings during the short while that they had been married. He had told her he was working on an odd and rather fascinating experiment, something to do with magnetism and electricity. If she had entertained any doubts about the truth of his explanation, they had been dispelled on previous visits to the laboratory

The equipment and machinery aroused her curiosity, satisfied something in her that craved the austere beauty of metals in geometric forms, the gleaming parts of intricately-shaped, mysterious mechanisms. She was content simply to watch the ionoscopes and spectroscopes and Heaven knows what other scopes and ometers that filled the laboratory. Or to watch Langston, even though he became so absorbed in his work that he scarcely noticed her presence.

She wasn't entirely sure that he approved of her visits, though it was he who had told her to drop in some evening if she wanted to look the place over, and these infrequent occasions were far more exciting than sitting at home waiting, or reading a magazine, or tuning in the radio.

A gust of wind flung fine snow against her face and legs with the sting of needles. She hurried faster. She might have picked a better night, but there was the hunch—merely a restless feeling, a desire to be with Langston, the need to get out of an overheated apartment.

This last block was particularly bad—brick houses part of the way, flush with the sidewalk and looking cheerless in spite of the occasional yellow light that straggled out; then some warehouses and storage buildings, bleak and desolate; then the six-story structure of the Power Research Laboratories. It was an even colder and windier street than the others. It seemed to have a

Suddenly, she stifled a gasp. Her body stiffened. Something was wrong!

special lure for the biting blasts that tore in from the Hudson. It was a mongrel block anyhow, one of those queer jumbles of residential, office, and warehouse buildings that New York breeds.

She sighed with relief when she reached the door of the laboratories. She even felt glad to see the face of the bored night watchman who let her in, to the accompaniment of an eddy of snow and a dismal wail of icy wind.

"A nasty night to be out in," he volunteered. "Mr. Hill is in the basement laboratory Know the way?"

"Yes, thank you, I've been there before."

SHE FLUFFED snow from her collar as she walked toward the elevator

bank. The basement laboratory was the one where most of the heavy equipment and high-powered electrical machinery were kept. Offices occupied the ground floor. A wide miscellany of stocks, testing materials, and devices of every sort filled the floors above. There were dark rooms, special laboratories air-conditioned and filtered so thoroughly that not a particle of dust could upset the accuracy of delicate micrometric instruments.

Any element, any chemical, any alloy could be plucked from those vast supplies at a minute's notice. Any organic or inorganic compound could be broken down and all its constituents identified to a fifth decimal in percentage by those mechanisms and the men who manipulated them. Anything that concerned power, its transmission, its uses, or protection and insulation against it, found a way into the laboratories. On the top floor were the rooms for analysis of gases, gaseous compounds, and explosives. An ordinance required that such work be confined to the top floor. The city fathers, deeming this a safety device, did not bother with the fact that deadly gases may be heavier than air and sink, or that explosions may exert a pressure downward as well as upward.

Langston had told her odds and ends about the laboratories, the personnel, the equipment. Stray bits of information drifted through her thoughts as she entered the self-service elevator and dropped to the first basement.

She emerged in another corridor lined with darkened and locked rooms. The corridor itself, well-lighted, led directly to the largest of all the units, through whose door a blinding, greenish-white light was pouring. Already becoming warmer in the carefully controlled temperature of the building, she loosened her coat as she let herself into that artificial daylight.

A deep, powerful, and persistent drone beat upon her ears. She had heard the hum of dynamos, the whir of generators, the purr of motors, but never before with such steady intensity as this. Her eye was caught by a great hollow sphere suspended from the ceiling and brushed by an endless belt. The surface of the giant globe glowed and crackled, burst into incandescent crackles of electric discharges that leaped forth like jagged lightning and split the air between the globe and the ground contact with concussions of thunder.

Langston, eyes shielded, hands protected with rubber gloves, stood manipulating switches and rheostats and amplifiers of a giant control panel, like a magician waving wands of mysterious power. He could not have heard his wife enter, above the drone and roar in the laboratory; but his hands moved, the blinding discharges ceased, the hum of the dynamos sank to a tone almost inaudible by comparison with the former noise.

His face was flushed, excited. He slid the goggles up to his forehead. "Hello, darling, what the deuce brought you here at this time?" he called as she walked toward him, and gave her a quick if somewhat perfunctory kiss. Langston was youthful but of indeterminate age, perhaps thirty, perhaps forty. He looked rather thin now. He had been eating irregularly and working late on this new research problem. His eyes had a bright thirst in them. Marjorie wished the thirst was for her, but knew it existed only for knowledge of matter and energy and life whose secrets he was trying to wrest.

"I'm not interrupting anything important, am I?" she asked.

"Don't be silly. Is it late? Nine-thirty? Good heavens, I'd no idea the time had flown so fast. No, I'm glad you came. You're just in time to see something interesting, if it doesn't prove to be a complete dud. Throw your coat on the table. And keep clear of the ob-

servation area. I'm going to set up a field of high tension there in a minute."

Marjorie wriggled out of the coat, but Langston saved her the trouble of depositing it. He tossed it with an expert flip that landed it ungracefully on the table a dozen feet away.

"I don't think that's the best way to treat my practically only good coat," she objected

"But it saved time and we'll get home so much the sooner. Anyway, I'll buy you another," he promised blithely.

"How much longer do you expect to stay here?"

He shrugged. "A few minutes at most. I was just testing out some apparatus before making an experiment."

"What about? What will it prove?"

"Frankly, I haven't the slightest idea," he admitted.

Marjorie wrinkled her brow in mock seriousness. "That seems like a perfect way to make a living. Going around doing experimetns that you don't know anything about. Is that what they give you those nice big checks for? Maybe they would like to hire me for the same thing?" she suggested hopefully.

Langston smiled down at her. "Well, it isn't quite as bad as all that. I do have an idea of the conditions I am arranging, and what the probable results may be; but, after all, the purpose of scientific investigation is to gather information rather than try to prove some preconceived theory."

"That makes it perfectly clear. Now I know exactly what you are doing."

Langston's smile changed to a look of speculation. "I wish I could say the same I've been at this thing off and on for months now and I'm still somewhat in the dark."

"Why?"

"Partly because every one else is in the dark just as much as I am. My experiment, you see, involves electricity and magnetism; and no scientist has yet succeeded in evolving a satisfactory concept of either one, or an explanation of their exact nature. You've seen horseshoe magnets and electromagnets and electric discharges of various sorts, haven't you?"

"Of course. Everybody has."

"And you know that an electric current sets up magnetic lines of force around the conductor. Those lines of force exist, for instance, around the telephone wire in homes, around the ordinary magnet and the electromagnet. Furthermore, metal can be magnetized and electrified by induction, without direct contact with the inciting current."

MARJORIE listened patiently, wondering what he was leading up to. "That's all more or less familiar stuff. I remember it from a general course in physics from my high-school days. Don't tell me you're going to spring wireless transmission of power on me?"

He shook his head "This is something less practical, commercially speaking, but it may mean a lot more. What I've been getting at so far is that there is a definite relation between magnetism and electricity, but a relation that is still about as mysterious and unknown as the precise nature of either electricity or magnetism. And to make it more complicated, recent studies have indicated that there may be a definite relation between electric energy and life energy. Have you ever heard of the electrogenetic theory of life?"

"Yes, but I don't remember much about it," she admitted.

"Crile and other contemporary scientists have suggested that the life impulse may be essentially electrical. The theory is that the brain cells, in issuing a command through the nerves, do so by minute waves or currents analogous to electric currents. The brain may be likened to a highly complex and delicate switchboard, controlling myriad parts of the body and its actions, and supplied

by energy originating from the metabolism of food.

"The theory has even been advanced that telepathy may some day become a reality when more is known about these obscure, tiny impulses, and that by developing them, the brain may be able to send out thoughts or impressions somewhat after the fashion of a radio message, at least for short distances. Organic chemistry and biochemistry have immense problems to solve. However, that is aside from the object of my own researches."

"Whatever that may be." Marjorie wrinkled her nose. She always felt insignificant in the presence of the gleaming machinery of the laboratory, impressive in rest and implicit always with the threat of almost unlimited power. The faint hum of the dynamos needed only a touch to send them soaring into a chant of strength and a drone of swelling energy.

When Langston talked of his work, though only in simple or broad, general terms that she could understand, he gave the impression of skirting the borderlands of regions where mysteries prevailed and where to grasp but one marvel was the achievement of a lifetime.

Langston said, "You might raise the objection that if electric impulses exist in the human body, why is it not affected by proximity to fields under electrostatic tension? It is affected, and sometimes destroyed, of course, by direct contact with high voltages. But why not by fields of electrical tension, or of magnetism, or a combination of both? And the answer might be, it is affected, but in so small or obscure a degree as to be unnoticed. Or another answer might be, there are varieties of electrical energy, and that which activates human life differs from that which activates a metal conductor.

"I've been carrying on some interesting experiments along that line—trying out new alloys and conductors, using bombardments of electrons, gamma rays, cosmic rays, and so on. Why? Because I am convinced that there *are* varieties of electricity; or, to put it another way, electricity is a category under whose heading come the subdivisions of the different kinds of electric energy."

Marjorie ventured, "And now you're going to put out a paper on the kinds of electricity?"

Langston shook his head. "No, though that would be revolutionary in itself. This is all incidental to the main purpose of my work, which was simply to set up an electrostatic field whose nature and properties are identical with those of the electric impulses in the human body, but a field that naturally would be much stronger and more powerful.

"I've been trying for months to establish such a field. The trouble was that I didn't and still don't know any more about the exact nature of electricity or magnetism than I did when I started. I knew that various kinds existed. I knew that electric reactions in living beings differed from those in metallic conductors. But I could not analyze them and specify the difference. I had to work on a trial and error basis. I tried every way I could think of to set up different kinds of fields of varying intensity.

"Marjorie, I succeeded in doing what I wanted, to-night—not long before you came in. It was only a small field, under a tension of just 500 volts, but it exactly corresponded with the type of current in the human body. I got the strangest, tingling, exhilarating effect, though I merely stood at the edge of the field. I can't yet predict the result. I only know by that sensation that there will be a result, that my work is about to reach its climax.

"I've tapped or discovered or created or whatever you want to call it, a life-current, which I can amplify to a hundred or a thousand or a million times

the strength of the strongest current that ever flowed in a human being!"

THE GIRL thought of it, and without reason shivered.

There was a glow, a bright glow, in Langston's eyes. His face, under the strong illumination of the laboratory, shone of something stronger still, as if a vision of intolerable splendor fascinated his gaze. The passion for discovery, the thirst for knowledge, the glory of achievement, raised him to a fever of excitement and exaltation.

Marjorie shivered. Sharing the flood of his enthusiasm, yet she was bothered by vague, formless fears. She had difficulty in following the broad outlines of his experiment and could only dimly guess at what it meant in technical terms, and in all its ulterior ramifications. Some faint tocsin stirred within her, a feeling that she could not explain because she lacked the scientific background and the technical knowledge necessary to know what the dangers might be.

Langston spoke, almost to himself, "When I drew near that electrostatic field, small as it was, I felt a buoyancy of spirit, a surge of pure energy, a wave of ecstasy as though every faculty were heightened a dozen times. It was indescribable. Intoxication without distortion. The wine of life was raised to its unclouded essence, and sparkled with a richness headier than champagne. For the first time, I understood Plato's vision of absolute beauty."

Marjorie said, "It must have been a wonderful sensation. Tell me all about it on the way home. I feel stuffy in this air."

Probably her words did not register on his consciousness. "It was a field of low tension, a tension of only 500 volts, but for a moment I was immortal. If that small amount of power from the artificial life current had so great an effect on the real life current within me, think of the tremendous heights I should reach and the overwhelming ecstasies that ought to flash into triumphant fullness when I set up a field under tension of 500,000 volts! I am going to set up that field and place myself squarely in its center!"

Marjorie cried out, "You can't! You'll be electrocuted!"

"No, there is not a piece of metal upon me There will be no accident. You shall watch, and you shall join me then in experiencing the current of life to a degree that the most vivid imagination has never been able to project. There is nothing to fear. If you had felt what I felt a while ago, your only mood would be one of longing and glad anticipation."

HE DID not hear her protests as he pulled the goggles down over his eyes. To her gaze, his reddish hair, tough and wiry, seemed already to be charged with static electricity and half standing on end. Fear dwelt within her, fear of something unknown, for reasons unknown. She tried to still it by thinking that Langston had already foretasted what was to come, by reminding herself that he dealt with forces he understood and controlled. It was only natural that she should be nervous, because the machines and equipment were comparatively new to her, and because she had not, like Langston, become familiar with them through long association.

She tried to visualize what the sensation would be like. It must be truly extraordinary, since it had caused so deep an impression on her husband. But would its effects last? Would not life become unbearably dull after one had been subjected to the artificial life current? If the effects were only temporary, why torment oneself with brief visions of glory? Perhaps the experience would develop into a habit, like the use of drugs, requiring larger and ever larger doses, and leaving the addict in-

creasingly exhausted when not under the influence. And though it extended the pinnacles of thought, sensation, and emotion a hundred times higher than they reached in normal existence, would it not affect the whole stream of life? Wouldn't it also deepen the pits of depression and make the fears that beset us a hundred times worse?

Memory reeaptured for her from the oblivion of time the disappointments she had known, the excitements, and the moments of greatest joy. Grief had been hers over the death of a sister, grief that would have killed her had it been a hundred times worse. She had felt the shock of excitement in an auto accident, but her heart could not have stood the strain if that shock had been much intensified. When she met Langston, he had struck a responsive chord that electrified her whole being; if the intensity of that emotion had been multiplied, it would have been more than flesh could endure.

Many thoughts and images crowded through her mind as she watched him walk to the control board. A prophetic expectancy had somehow crept into the laboratory. The machines affected her tense nerves like individual entities, as though they were all waiting for him to give them life. She had the queerest feeling, not that he would draw power from them, but that they would draw power from him.

"Dearest," she ventured, "I wish you wouldn't make the experiment to-night. I'm uneasy about it. I don't know why. Let's leave and you can finish it some other time." But she recognized that her appeal was futile when she made it.

Standing by the master controls, he replied, "There is nothing to worry about. Watch! It will all be over in a minute. For that matter, there won't be much to see. I'll establish the field between those two upright electrodes and walk between them. There'll be something of a racket from parts of my set-up outside the field. You'll see some discharge but don't let them frighten you. I don't know how much if any change will be visible in me. I rather expect the feeling to be like crowding the experiences of a month into a minute's time or less. Contact!"

His hands flicked over the switches.

The hum of dynamos, the whir of generators swelled to a drone of power. On the surface of the giant sphere, electrostatic electricity began to collect and crackle. To one side of the switchboard, a maze of apparatus that she had not paid much attention to became vibrant with energy and dazzling with light.

Two flat electrodes, each six feet high and four feet wide, stood upright a dozen feet apart. One of them was grounded, the other connected with the maze of metals, gas-filled tubes, conductors, and other parts and devices which had surged into life. A current of brilliant green raced with a restless waver through one tube shaped like a hook; from there it flowed into a conductor of silvery sheen, emerged in another gaseous tube that was flaming scarlet, and passed on to still others. A weird beauty hung over them. A strange, complex instrument, vaguely similar to X ray apparatus, glowed with mysterious light, and emitted an invisible bombardment from what looked like the nose of an eight-inch shell.

A life current, Langston had called it—the unseen current that established between the electrodes a field of high tension, developed from the interaction of visible current which she watched. He had wrought a miracle of science, an impressive symphony of power. What she witnessed exerted a hypnotic spell, but only an external fascination, disturbed by internal evocation of the end product, that invisible life current now pouring into the electrode.

She lacked the will to speak when he left the switchboard. She merely walked

closer, the better to watch. This was his hour, his moment of triumph. The rewards of victory belonged to him. He had blazed a new trail that earned him the pride of achievement. She regretted fleetingly her expressions of doubt and her attempt to dissuade him.

His face was dreaming as he walked along the edge of the field to a point midway between the electrodes. She thought that a cryptical gleam and a quizzical smile formed in his eyes and mouth as he stepped into the field.

"Langston!" she cried out.

For the briefest moment, his face, his body, his entire being, expressed a transfiguration into an existence half-satanic, half-divine, with a look of terrible ecstasy. Life, amplified a thousand or a million times, and flooding one instant whit of those hopes, loves, desires, fears, thoughts, and emotions that belong to the kingdom of dreams, fulfilled his dream of glory.

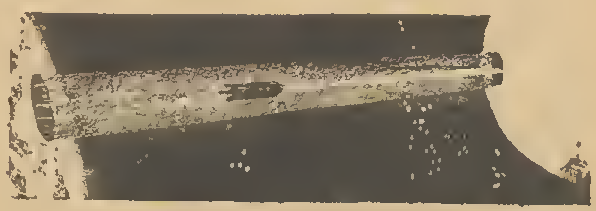
"Langston!" she screamed, and her shriek echoed, far away and appalling, to the night watchman.

LANGSTON had established an electrostatic field that was identical in kind with the infinitesimal electric impulses in his body, but which was far stronger in degree The field intensified his own life current in the same way that an ordinary electrostatic field electrifies a sliver of steel introduced to it. The special, peculiar field which he had created also magnetized and polarized him. The negative charge collected in his head and hair. The positive charge collected in his feet.

Instantly, as though pivoted, his body swung horizontal in mid-air, head toward the life current electrode. He slammed toward it like a bullet. At the moment of impact, when his skull burst and his brains were driven into his vocal chords, the negative end discharged into a positive electrode, leaving him positively charged. Like repulses like. He was immediately hurled to the ground electrodes where his feet mashed and his hip bones ploughed into his stomach. He could have kept on bouncing back and forth between the electrodes, in the manner of a pith ball, but his life current was gone. The pulp plopped to the floor.

Perhaps Marjorie thought of the consequence; perhaps blind impulse drove her; or perhaps she moved mechanically in the shock of horror. She stepped into the field of tension.

The night watchman, coming on a run, had not fully prepared himself for an emergency. He fainted inside the doorway as he saw the effect of Langston's last experiment.



The 32nd of May

The elapsed time must have been two hours at least. The plane extended for many miles in all directions. How?

by Paul Ernst

I HAD spent the evening with Mr. and Mrs. Barton, old friends of mine, at their Long Island home. It was the thirty-first of May, their wedding anniversary. We had talked long over the dinner table, and longer yet in their living room before the fireplace.

It was a most comfortable, attractive-looking room. It was long and rather narrow, not quite square but with an odd angle to the inner wall which made the north end of the room about two feet wider than the south end.

Fine prints hung on the walls, with an antique Florentine mirror making a bright oblong at the south end of the room. Four or five feet in front of this mirror, set at an angle so that by looking into the Florentine glass one could see his reflection in the back, was a five-foot pier glass. The long mirror had been rolled in here while Mrs. Barton showed us—and refreshed in her own ecstatic memory—a fur-trimmed black summer wrap Tom Barton had given her for an anniversary present.

A pleasant evening with old friends! But when I looked at the clock I exclaimed aloud and stood up. The hands pointed to one minute of twelve.

"Is that clock right?" I asked. "It can't be midnight."

"The clock is right to the second," said Barton, who is one of the most exact and methodical of men. "Checked with the observatory. But the night's young yet——"

"Not for me it isn't," I interrupted. "Where did I leave my hat—— Oh, it's over there beyond the pier glass."

I tapped my pipe out into the fireplace. The minute hand of the clock swung over the figure 12. The first stroke of the elaborate electric-gong arrangement which Barton had had built into the clock, sounded out.

I started toward the pier glass for my hat, which lay where I had carelessly flung it on a window seat.

The clock seemed to keep time to my steps as I walked. One, two, three, four——

I looked into the Florentine mirror as I approached the window seat. I saw my own back in the pier glass. And I noticed idly that as I moved forward, my reflection in the pier glass behind me seemed to step out of a frame and into—nothing!

Eight, nine, ten, struck the clock.

My feet fumbled with something just as my reflection had passed completely out of the frame of the pier glass save for the tip of my coat tail.

The eleventh note of the clock sounded. Then, on the dying waves of

From beneath that plane a figure appeared. It vanished, then he caught a thin line, then it was elliptical. It turned toward him.

sound vibrations, the first sound waves of the twelfth note rang out.

I felt myself trip forward——

Since that evening I have spent a lot of time trying to figure out what happened Indeed, I've thought of nothing else. But I can't even arrive at a theory concerning what occurred, and I doubt if any man can.

I passed between two mirrors, facing each other at an angle allowing both my face and my back to be seen by me. My reflection passed out of the pier glass, I tripped, and the beginning note of the twelfth stroke of midnight, all occurred at once. That is all I know.

Then I was on hands and knees, laughing a little at my clumsiness in tripping like that

I started to say something to Tom Barton—and words and laughter froze on my lips.

THERE ARE some shocks too great for the human mind to assimilate at once. In war, for instance, it takes a man several seconds to realize, after the terrific physical impact, that half his abdomen has been shot away.

Similarly, the shock I experienced then was too vast to be appreciated for what seemed to me a full minute.

The first thing I consciously noted was that the light was changed.

In the Barton living room the light had had a pinkish cast, tinged by the flames in the fireplace. Now, suddenly, the light was pearl gray, rather dim, and steady as the light of dawn.

The next thing I noticed was that the window seat before me with my straw hat lying in its center, was no longer there. Nor was the window behind it, nor the house wall in which the window was set.

Instead of having my gaze stopped by these things, it went on and on to a horizon far, far in the distance, a horizon that almost lost itself before its thin line showed.

I blinked my eyes and looked again. The same vast distance, illuminated by the steady, pearl-gray light, remained.

The first terror stabbed my heart. I must be going mad—must have gone mad instantly, with reason snapping off as an electric switch is turned. I had been in Tom Barton's living room. Now, in the flicker of an eyelash, I was——

Where was I?

I looked down. At my feet lay the object I had apparently stumbled over, a hexagonal rod of about the thickness of my wrist. I touched it with the toe of my shoe, and it moved a little! I followed the line of it along the ground, and saw that it ended in a squatty mass, about thirty feet away, that was hexagonal in shape and stood perhaps four feet high. Like a small, hexagonal tank with a three-inch hexagonal feed line trailing the ground from it——

But the feed line was not trailing on the ground! This was not ground I was standing on! It was—— I could only describe it by saying that it was *substance!*

It felt firm yet elastic under my feet I sank in it a little, yet there was no feel of surface looseness to it. The sensation was like that of standing on a partially-deflated rubber tire.

I looked around some more, dazed, too shocked to have more than a numb perception of my surroundings. On all sides were the hexagonal masses, from each of which, like incredible roots, trailed straight, hexagonal feed lines, or feelers There was only one possible impression to be received. That was, that the bizarre, geometric masses were plants of some kind. and that the feelers, over which I had tripped, were roots.

Hexagonal plants! Hexagonal roots!

Hardly knowing what I was doing, I kicked at the rodlike root at my feet A chunk of it flaked off, and I saw the parent mass quiver. But I only saw—I did not feel It was impossible for the moment to feel any more than the initial shock of finding myself here——

It is words that bring shocks home to consciousness.

Finding myself here—— But where was *here?*

I told myself again and again that I must still be in the Barton living room, that I was only suffering from optical illusion.

But it was useless to mumble that! It was meaningless gibberish in the face of the horror with which I stared around and took in the whole picture of my new setting.

I was a mite on a plain of cosmic vastness. A plain? It would be more accurate to call it a plane! For it was as flat as a sheet of steel, like a vast flat plate on which I stood like a bug on a dance floor, stunned, appalled at the sheer immensity of it.

Everywhere as far as the eye could reach were the hexagonal masses—plants? soft rocks? animate beings?—with their rodlike hexagonal feelers radiating from them in straight lines. And over all was shed the pearl-gray light, coming from everywhere and nowhere

Where was I?

It was then, I think, that I shouted aloud in pure, blind terror—and discovered a second fact about this gray universe. There was no sound in it.

My lips opened with what would have been almost a woman's scream of horror; my lungs compressed as they drove air through my larynx—and not even a whisper of sound came from my distorted mouth!

A soundless, motionless world of gray, with geometric masses rooting in a plane made of some firm, rubbery stuff that was no more like the ground we know than air is like iron.

But I wasn't here! I was in Barton's living room! I was mad, or suffering from hallucinations——

I kicked the root at my feet and saw another flake slough off. And again I saw the parent, hexagonal mass quiver, thirty feet away.

There was no hallucination about this! *Where was I?*

And then the full shock came home at last, and I was a complete maniac with reason knocked entirely from its throne

I dimly remember running over the resilient surface, among the hexagonal masses, screaming soundlessly in nightmare terror. I think I blundered into some of the masses, for I seem to remember the feel of them as spongy and rubbery and vaguely moist.

Then oblivion, either of actual unconsciousness or of complete nerve prostration, came over me and blackness replaced the cold, monotonous gray light

I THINK it was a change in light impressions, beating through my closed eyelids and against the rods and cones of my eyes, that brought me back to consciousness—and to stark, brain-shattering fright.

For an instant I had the sensation of having seen a dim sun, like a big orange disk. And I glanced around me with the wild hope that is quick to rise in the mind even at impossible times

I had had a curious, frightening dream for an instant. Now I was back in the Barton living room——

But around me was the pearl-gray immensity, and under me was the elastic firmness of the resilient ground so inexplicable to human understanding The wild hope died instantly. I was still in this incomprehensible place, like a being exiled in a twinkling of an eye from his own planet. And a fear as far beyond words as was any real description of my surroundings, filled my soul.

And then I saw, consciously, the thing I had vaguely seen in semiconsciousness—an orange disk like a dim sun in the gray heavens.

But I saw now what I had not had clarity of mind enough to see before—that the thing was not a far-off sun, but a reddish-yellow disk, like a new penny twenty feet across, in the air less than forty feet from me

As though feeling my gaze on it, the disk slowly turned its edge toward me. Thinner and thinner grew its ellipse. Then—it disappeared.

It disappeared, yet it was still there! I could feel that it was there, with its thin edge turned toward me, but with that edge imperceptible as would be the edge of a plate made of infinitely thin tissue paper.

And then I felt still more. I felt, abruptly, with sure instinct, a sense of impending peril!

I stumbled to my feet and backed away from the place where the disk had

been. I backed till I bumped against one of the six-sided masses—and as I backed I saw in the air before me a thin orange line that bulged in the middle, and then a narrow ellipse.

The thing was still there. It had not actually disappeared; it had simply turned till its thin boundary line was presented to me. And when I moved back I had reached an angle where I could gaze across its surface and see it again.

In a word, the disk was two-dimensional instead of three!

I cowered back against the hexagonal growth that had stopped my retreat. As I crouched there, the thin ellipse became an orange disk again, as if the thing had to turn squarely toward me to observe me. And I had the distinct conviction that I was being observed, that watchful eyes were on me.

And now the disk began to incline toward me and become an ellipse that was horizontal instead of vertical. Thinner it grew, till it was no longer in sight—only in consciousness.

There was a stir of movement on the "ground" under the spot where the disk hung invisible I saw something like a pencil line against the gray slate of the heavens. The pencil line seemed about seven feet long. It wavered in spots, growing thicker and disappearing alternately, like a row of flat paper disks on a string held upright and moving in a breeze.

But the line or thing or whatever it was, was moving toward me!

Some two-dimensional thing had gotten out of the two-dimensional disk, and was approaching me!

I moved, and instantly the wavering, approaching line was still, and disappeared. But the thing was still there, all right. I sensed that—and at the same time sensed that I was in more danger than I'd ever been in before.

I would have run, but I was unable to. I could only crouch against the spongy mass of the growth and glare ahead of me toward the spot where the wavering line had been. And as I stared, I saw the line slowly grow into being again. But now it was not wavering. And it was several minutes before I realized what had happened.

The thing that had come from the disk was not so close to me that I could see it, in spite of the fact that its edge was still toward me, because of the bifocal functioning of my eyes. With my right and left vision I could see a very little of its two-dimensional breadth again, so that again it had become a thin line to me. Which meant that it must be within a few feet of me!

For what seemed ages the line remained just that—a line. Then it thickened—more in some places than in others, as the creature turned, till at length I could see the full breadth of a thing that makes my blood run cold even as I tell of it.

IT WAS fully seven feet tall. It was rather manlike in general outline, yet it did not even vaguely resemble a human being. It had no legs, but stood on what appeared to be a single, thick leg like an oblong pedestal on which was set the keystone-shaped torso. Atop the torso was a perfectly round disk in the center of which was set a single eye, which also was round It had arms, of a sort—two long narrow oblongs hanging by its sides. There were no joints perceptible in the arms, but I saw them curl inward a little on each other, as the creature stood watching me, which indicated that there were no bones in the thing which would necessitate joints.

Oh, yes, it watched me!

Even as I stared at the nightmare curiosity, it stared back at me with its single eye, which was dark and humid-looking, and all pupil, like the eye of an intelligent bull terrier. But there was a difference. For I stared with fear and appalled curiosity, while it stared

back with curiosity only. There seemed to be no fear in its examination of me —only a sort of warlike wariness

Abruptly, I couldn't see it any more At one instant it was before me, then it was not. I winked my eyes rapidly, but it did not reappear.

Then I caught movement out of the corner of my eye, and turned swiftly to the left. There the thing was scrutinizing me out of its cold, dull, single eye.

How did it move on that single leg, or pedestal? Above all, how did it move so swiftly? I don't know First it was in front of me, then it was to my left. That's all I can say. No time seemed to have been taken in its movement, and it made no sound But then, there was no sound anyhow in this ghastly gray place; or, if there was, it was of such a nature that my human ears could not pick it up

I shivered. The expression in the dull, lidless single eye told me that the thing was all through with its looking, now, and was about to act. Furthermore, the expression told me that the action would be savage, for the dull eye shone suddenly with deadly ferocity.

It had no hands, as we know hands. But the ends of its arms seemed slightly more flexible than the rest of it, and I saw these arm ends coil behind its back and come out again with a short thin rod held in each.

The two rods seemed to be of solid metal, of what sort I do not know. They were square, about a foot long. Just two metal rods, which were pointed at me. But the way in which those rods were leveled, together with the deadly look in the thing's eyes, made the sweat crawl out on my body.

The creature turned the rods slightly so that the square ends became diamond shapes as I stared, fascinated, at them. Then it slanted one, ever so slightly, toward the other, forming a queer, open-ended angle——

Again a soundless scream tore from my lips. For with that deliberate though meaningless—to me—move, I suddenly felt as though two great winds strove to tear me to bits. I swayed, there by the hexagonal growth, as though I stood in the center of a whirlwind—while the thing watched me with callous interest out of its inhuman eye.

And then I was released from the mystifying, deadly pressure, and the creature was gone.

I don't know how I knew that it was really gone, instead of just turned edge on me so that it was invisible but near. I don't know how I knew that I had barely escaped a death incomprehensible to my human mind But I did know. I think the only guess that can be made as to how I knew, is that there in that place where man's mind and man's reasoning power were as useless as machine guns in a world of ghosts, the animal instinct buried deep in me as in every human being began to function with desperate oversensitiveness in the age-old effort at preservation of life

Anyway, I was sure that for the moment my life was spared, though why I could not guess. And I began frantically to try to scheme how to get back to the place from which I had so strangely slipped—the Barton living room.

But for a moment, as I thought of that friendly haven in a world peopled with friendly, understandable three-dimensional beings, my mind almost cracked.

Where or what this place was, I couldn't imagine. How I had tripped over something in Barton's living room —and picked myself up off hands and knees in this unholy place—I couldn't dream. And for the moment I didn't care I could only think of one thing: *Suppose I was doomed to stay here for the rest of my life?*

I moaned and babbled there by the spongy, gruesome plant—with not one sound coming from my lips to disturb

the dead noiselessness of this gray world. But then I got a grip on myself and began to think constructively.

I had tripped over something in the Barton room, and fallen into this place, as a man trips over the threshold of a door and stumbles into an unknown room beyond. In this world, or room, the thing I'd tripped on was one of the rodlike roots of a plant. What the corresponding thing was in Barton's living room, I couldn't guess, and, again, didn't care.

My task was to find that root! If I could find it, it was at least conceivable that I might back across it and once more find myself in my own homely world. If the move didn't take me there——

Well, if I found the root, and couldn't step back across it into human, mortal life again, I knew I should either go mad or kill myself. But I closed my mind to that possibility. Enough, for the moment, to find the root

But at this point I looked around and was appalled.

IN ALL DIRECTIONS, as far as the eye could see, the hexagonal growths dotted the vast plane in interlacing geometric patterns that made me dizzy when I tried to untangle them. And each growth looked just like all the other growths, with no distinguishing mark to attract the eye.

I climbed to the top of the four-foot mass nearest me and, sinking to my ankles in the repulsive resilient substance of it, peered around again. The only result was that I could see more of the identical, six-sided protuberances.

Desperately I tried to remember which way I had run when I lost my head and fled in blind madness. But I couldn't. And I believe that moment would have been my last if I had not chanced to see, by accident, a flaw in the side of a plant a few yards to my right.

I ran toward the plant. And as I neared it, my hopes grew.

There was a ragged chunk out of the side of the thing—and in no other that I could see was there a blemish of any kind to mar the geometric perfection.

Had I passed that way? Had I knocked a flake out of the side of it by blundering against it? I sent up a silent prayer that that had been the case

I reached the marred plant, and fell, gasping and shuddering against it. Then, with my eyes aching with the intensity of my search in the gray light, I walked around the plant examining the stiff, straight, six-sided feelers raying out from it.

A root that had two chunks out of it! A root marked by the toe of my shoe!

Four roots went out from each of these strange masses. Three of the roots I looked at on this plant were perfect, unmarred. I clenched my hands till the nails bit into the palms. The fourth——

But suddenly I stiffened. In the air before me had appeared another orange object. Rapidly it grew till it hung motionless within thirty feet of me. But this was not the thing I had seen before. That had been a disk. This was a triangle.

Dimly glowing, brilliant orange, the thing hung in the gray atmosphere. And again I had the hair-crawling sensation of being observed. Also, I had the distinct conviction, in a swift moment to be confirmed, that the appearance of this orange, isosceles triangle was the reason for the disappearance of the orange circle. The thing in the circle had retreated before the advance of the triangle and whatever it contained.

The triangle did not vanish from my sight as the circle had It remained suspended before me, and became an orange background for the thing that came from it A thing much like the other monstrosity that had come from the circle.

The creature from the triangle moved

toward me. One small portion of my brain occupied itself with trying to figure out how the thing moved, for the pedestal it had for legs remained motionless It simply seemed to float toward me from the triangle from which it had somehow detached itself. But most of my mind was in a frantic chaos of returning horror. For again the sense of being in terrible danger had returned to me.

Ten feet from me, the monstrosity from the orange triangle stopped. I had just time to see that its single eye was purplish blue in color, whereas the eye of the other thing had been dark brown, when its "hands" jerked toward me with a short square rod in each.

The rods formed at once into the queer, open-ended angle that the first creature had pointed at me. And at once I leaped to the right. For I had learned already that the angles these fantastic creatures formed with the rods were somehow able to produce deadly results.

I leaped to the right, but I did not move fast enough.

I felt the invisible winds, or currents of mystic power formed in some way by the angle of the two rods, tear at my left side.

And I looked down at myself to see that my left shoulder hung two inches lower than it should, and that my left arm was so dislocated as to be twisted almost out of its socket.

Again, the shock was so great that it beat the pain that must come soon. I could only stare stupidly at my arm and dodge again as the thing with the single deadly eye shifted its rods.

Once more, however, I was spared by a swift disappearance.

The creature from the triangle suddenly vanished, leaving me to stare at my hideously-dislocated arm and reel with the pain of it

Then I saw the reason for the second disappearance. The orange disk had come back. It hovered in the air near the suspended triangle—and suddenly darted at it.

Circle hit triangle. There was no sound, but I got a sense of terrible shock as the two figures rebounded. A sense of shock, and of terrific, warring powers.

The two figures again rushed together. Again there was no sound. But this time I was flung to my knees as if by an earthquake, though the things were fifty feet from me. And I saw that the second impact had settled the struggle.

Two thirds of the triangle slowly vanished, paling more and more till it so blended with the pearl-gray light that it could no longer be seen. The remaining fragment fell slowly to the ground, turning over and over in its fall like a bit of thin paper.

As it hit the surface I screamed again into the noiseless air and fell to my hands and knees and scrambled for the root with the two chunks out. For with the fall of the triangle fragment the disk had turned toward me and—before a man could have snapped his fingers—the first monstrosity stood in front of me again, glaring at me out of its dull, deadly eye and raising the little square rods in my direction

I found the root with the marks left by my random kicks. I scrambled to about the position into which I had fallen from Barton's living room. For I was going to back across the root. Perhaps I need not have done that. Perhaps I could have simply stepped across the root and returned upright and face foremost to my own world. I don't know. The only thought I knew then was that I must duplicate in reverse every movement I had made in the terrible transition from my own sphere to this.

The two-dimensional creature formed his angle with the rods. I backed against the root, with my toes across it as I had first fallen.

I felt the great wind begin to tear at me

With my single arm, in a paroxysm of fright, I raised my body to a position where I could stand upright on the other side of the roof——

THE AIR was tinged with a warm, pinkish light. Before me was the wall of a house, with a window in it on the seat of which was a carelessly-flung straw hat. The musical vibrations of a clock bell were pulsing in the air—the Barton clock, over the fireplace, sounding the last note of midnight.

I stood for a moment with my back to the fireplace, shuddering, my clothes clammy with perspiration.

I heard Tom Barton say: "We'll have to do something about that rug. It's always rolling up and tripping people."

And I heard Ruth Barton laugh and remark: "How funny! You know, just for a fraction of a second after you tripped, I couldn't see you! I guess that means another trip to the oculist."

Then I turned around, and both of them stared at me with open mouths.

"What in the world!" exclaimed Ruth at last "Why, you're as white as a sheet—— Tom! Hurry! Phone the doctor! He has dislocated his shoulder horribly!"

I made my way weakly to the nearest chair, and sank down in it. But as I went—I turned the tall pier glass from the damnable angle it formed with the Florentine mirror on the end wall!

This is the first time I have told this story And as I say, I can offer no explanations.

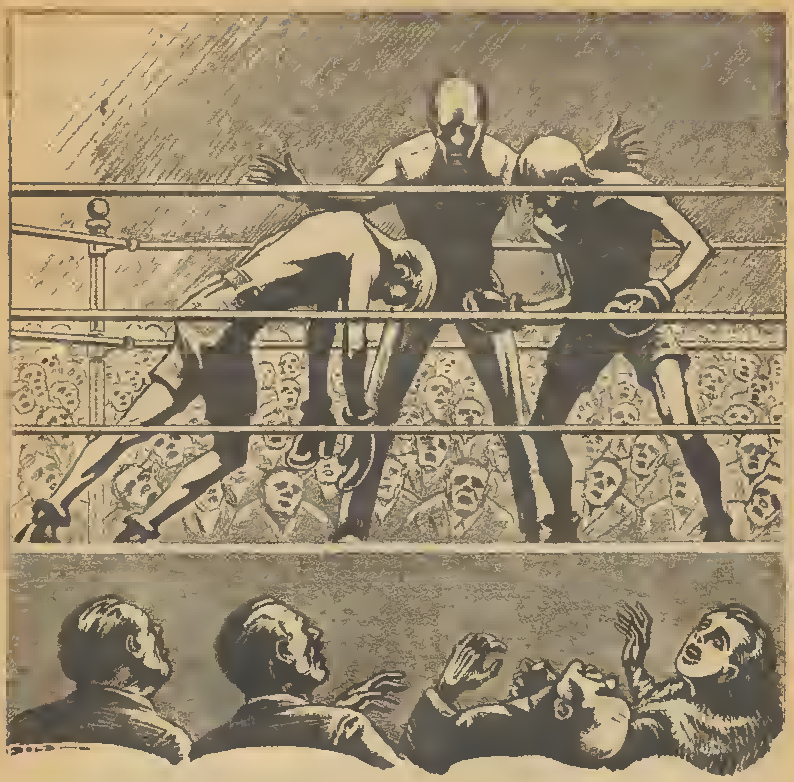
I passed between the pier glass and the Florentine mirror in the Barton's oddly-angled living room. I fell—into another world, or plane, or dimension, or whatever you wish to call it, where unimaginable creatures seemed to fight each other with intricate angles formed with metal rods. It would seem that there are powers in untried combinations of angles undreamed of by man—and that perhaps geometry is a bridge between worlds. And it would seem that by chance the pier glass formed an angle with the mirror on the wall that transported me instantly from one plane to another. But your guess is as good as mine.

Even the tangible fact that I came back from the hideous gray plane with a terribly dislocated shoulder offers nothing to tie to. I might have dislocated it in my fall—though I know in my heart that that is highly improbable.

In only one thing have I any certainty of mind. That is, in the time element.

I passed between the grim angle of the mirrors and tripped into another sphere with the sound vibrations of the last note of midnight ringing in my ears I straightened back over the roof—and into the Barton living room—with the vibrations still ringing in my ears! Apparently no time whatever had elapsed, though I had wandered in the gray plane for many minutes.

But some time, as we know time, must have elapsed And since that time lay neither in the thirty-first of May, nor in the first of June, there is no possible way of expressing it other than to say that my adventure occurred during May the thirty-second!



AGE

by C. C. CAMPBELL

And then, suddenly, men grew old, in the ring, in the audience, everywhere

THE ORDER sounds innocent enough: "Empty the tanks." But had Raymond Finch been suddenly deprived of his voice at that moment, the world would have been spared its most tragic disaster. The fact remains that Al Santos did turn the drain spigots of the huge tanks, and several gallons ran out from each tank through narrow pipes and poured into the creek meandering past.

The creek drifted slowly on, carrying its deadly burden until it emptied into Lake Ashokan, and from there into the reservoir. Before being piped to New York City, the water was treated for

bacteria, though disease was less horrible than the water itself

Had the chemists been less overworked, they would have noticed motionless masses of clotted germs, signifying their lifelessness They did not; the iodine and chlorine were added to the water, which then was sprayed high into the air to gain added æration. The water was delicious, cold and singularly pure, the head chemist said. And the most potent destructive agent ever devised, he neglected to add.

Secrecy covered Finch's past. Yet this we know: Finch was once an excellent automobile mechanic, though in some manner he secured a contract from Paul Naughton, a wealthy speculator with a fiery interest in science that was unencumbered by his ignorance of its most simple first principles.

Naughton was the man who, against Finch's advice, paid a hundred thousand dollars for the patent rights—unsecured, of course—of an automobile that could last almost forever without requiring a change of parts, adjustment, or internal cleaning

The world laughed when Naughton announced his acquisition, but he was of the type that stands by his mistake, and ten years after having bought the machine, he was still to be seen riding along Fifth Avenue in his cubical, square-backed, stub-nosed freak. He made Finch admit the repair bills were quite small for a car of its age. That was not true, since the parts had been cut specially.

Rapidly, one after the other, he bought synthetic cloths, furs, and foods, only to find that the materials disintegrated when touched by water, and the foods possessed the same amount of nourishment and not much more palatability than the sawdust they were made of.

In his cellar were to be found preposterous machines for the synthesis of precious metals, two perpetual-motion machines, doors that opened and closed at certain words. At one time he installed these doors all over the house, with the result that they kept opening and closing during a conversation, whereas he kept forgetting the key words when he needed them.

The countless other machines were for the most part unknown in their functions They represented a sum in eight figures

One morning Naughton reached his office only half an hour after his office staff. As he approached the door after leaving the elevator, he heard the buzz of conversation. He recognized the symptoms and quickened his pace, so, though he appeared to be merely businesslike, he cleared his desk of its accumulated work in short order and was ready for outside business. He waited impatiently for his secretary's message.

"There's a Mr. Hannon to see you, sir," she said at last.

He pretended not to hear. She repeated the words.

"What's he want?" Naughton asked, rustling the papers on his desk as though he was searching for something important.

"He won't say."

"Show him in. I'll send him along double-quick time."

HANNON, a young blond colossus with a cast-iron crust, spread out a sheaf of blue prints on Naughton's desk without a word Naughton stared bewilderedly at them, yet with something of awe, for they represented science to him.

"What do they mean?" he asked huskily.

By asking that, Naughton let himself in for the most glib, scrambled explanation of a machine's functions that he had ever heard in his long years as the receiving end for quack speeches The idiocies, the ignorant inconsistencies, all the amazing unfounded lies, passed over

his head Hannon spoke swiftly and easily, only a man who knew bis subject thoroughly could speak so confidently, was Naughton's thought, if he stopped at all to think during that thrilling hour.

"Rocket," Hannon replied, smoothing out the creased papers.

"A rocket?" Naughton echoed.

"That's right, Mr Naughton," Hannon went on rapidly. "And this one will work, you can bet your bottom dollar on that. You see, in the old-type rocket, the differential exhaust was superimposed on the inner magneto. You see the error of that, of course?"

Naughton nodded eagerly.

"It's obvious enough when you come to think of it, but then we usually miss up on the most obvious things. The result was that the carbohydrate escaped without assistance in the initial velocity ——" And so on.

"What about the fuel?" Naughton asked, after an hour of such talk.

"Cheapest thing in the world—water." Hannon waved his hand deprecatingly. "We use oxygen and hydrogen. Get them by breaking down water."

"Who'll take care of that?" Naughton asked anxiously.

Hannon patted him on the back patronizingly—as a man of science relieving a layman of worry. "I've got the man for that. You just have to build a lab for us, and we'll take care of the rest. You worry about the financial end."

Thus Naughton met Finch, who had been doing repair work on his horror of an automobile for ten years He frankly admitted that Finch's scientific abilities had escaped him the entire time, he scarce suspected them

"Now," Hannon said, as the three of them sat in Naughton's gigantic living room later that week, "I've got the spot all picked out. There're plenty of thick woods all around Ashokan Dam. Build us a lab and a pipe line from the lake to the building, clear a couple of acres, and we're all set—even to a taking-off place for the rockets, when they're finished."

"How does that sound to you?" Naughton turned to Finch, who sat on the edge of his chair, afraid of wrinkling the rich cloth, and holding a fragrant cigar delicately in his grease-blackened fingers.

"Well—uh—fine! Except that I should think we'd need to have a permit or something."

"What about that?" Naughton asked Hannon.

"Just ignore it. If we have to, we can buy the land later."

Events followed so rapidly that Naughton could only see them pass in the swift succession of vastly padded bills. First, a handful of skilled workmen reached the location near Ashokan Dam on foot at night. By morning a one-story building was nearly completed, except for the shingling, which was done the next night, while parts of huge tanks were carried by other men to the site.

In three days the fifty tanks, each with a capacity of ten thousand gallons a day, were installed in the rude laboratory, and the pipe lines leading from the lake, through a pumping system, were buried four feet below the surface of the ground. The men were paid off. Immediately they disappeared silently, and the gurgle and soft splash of water replaced the muffled sounds of hammer and saw in the thick woods Added to that, soon after, was the quiet whir of a Diesel turbine

The birds and the creek drowned the slight disturbance.

Giant cathodes of electrodes in each tank broke down gallons of water into the components—oxygen and hydrogen. The gases, swarming out in great streams, were caught and held in tanks that automatically sealed when filled, and passed along an endless belt to a storage room

The "fuel" was produced in quantities that would suffice for a trip to Sirius. Finch and Hannon watched their bank accounts swell with each new bill rendered. In Pennsylvania, engineers and machinists stared embarrassedly at insane blue prints, then cut the weird parts as closely to the plans as was humanly possible.

Naughton dreamed dreams of exotic planets, monuments, and paragraphs—perhaps chapters—in history books.

II.

"IT WAS my opinion that they spoke too quickly," Dr. Hopper said.

Ross looked up at him for a moment, then bent back to his graduate and eyedropper. "You're partly right, of course. When the University of Southern California discovered heavy water back in 1934, it was the custom of most scientists to rush their discoveries into print before they were conclusively proved.

"Well," he shrugged, "there was as good a reason then for that practice as there is to-day; too many men duplicating the work, and all afraid the glory will be stolen. So, even at the expense of being a sensation, they claimed purely hypothetical abilities for their work."

"That's what I mean," Hopper agreed. "Take the work you're doing now as an instance. Heavy water was discovered in 1934, you say. A drop was given to a rat, which died soon after. A man in the physiology department suggested, more as a joke, I suspect, that the rat had died of old age. Now you say he was right.

"The point is, even though he was right, the experiment was done under the most unscientific conditions; the water was given in one dose to one rat. It killed him. There was no control, no comparison of results over a period of time, no slow observation of the effects on several rats—just a desire to break into print as quickly as possible. It simply happened to be this fellow's luck that he was right. But he still was anything but a careful scientist."

Ross continued dropping minute quantities of a colorless liquid into graduates containing five centimeters of water, carefully labeling each graduate with the required amount.

"That's so, all right," he commented when Hopper finished. "But you won't be able to accuse me of the same thing. I bought a full ounce of the heavy water from the college, the result of electrolyzing ten thousand gallons of water. If one drop can kill a rat, then I have enough to kill four hundred and eighty rats, but at a cost of eighty dollars. That's extravagant.

"I suspect, though, that it takes less than a drop to kill a rat. And I want to find out how much less, so I'm measurging eights and quarters of a minim into five centimeters of pure water. That's my control."

Hopper looked around the small cellar laboratory while Ross did his work. The tables lining the walls, usually filled with chemical and electrical apparatus, were covered with cages, each containing a large number of common brown rats. The smell was strong and disgusted him. Ross ignored it as he ignored everything else when working.

"Well," Hopper said, "I have to drift along now. "I'll be back every day until you're finished with the experiment."

"I wish you would. Then I'd have another opinion to back me up."

WHEN Hopper came in the next day, most of the cages were empty. Ross stood in the middle of the floor, staring around disconsolately.

"Didn't turn out so well?" Hopper asked quietly.

Ross started at the sound of his voice. He shook his head. "An eighth of a minim—a fiftieth of a minim—kills almost instantly. I don't know where to

start grading the dosage from."

"Cut the dose," Hopper suggested.

"Naturally. But, good heavens, man!" Ross exclaimed. "How small a dose will kill a rat?"

"That's what we want to find out. Try it from a hundredth."

Ross quickly measured off a hundred drops of water and added one minim of heavy water. This he shook well and divided into two equal portions, which he placed before two rats that appeared alike in health, size and physical strength

Both had been deprived of water for several days. They drank eagerly. Several minutes later they rushed to the food trough and ate as they had never eaten before in their lives. For an hour they ate—incredible amounts of food —without stopping

Then they lay down, refused to move, even when prodded with long pins. Not long after, they were dead.

Ross shrugged his shoulders. "A hundredth of a minim is fatal."

"Don't stop there. Try a thousandth."

Hopper stayed long enough to watch him mix one drop of heavy water with two and one twelfth ounces of pure water and feed the result to four healthy rats.

For three whole days they ate everything in sight, everything that was shoveled into their cage—enormous quantities.

On the fourth day they ate almost nothing. The day after that they were scarcely able to move around. When they died—early in the morning of the seventh day—they were hairless and wrinkled, shriveled to nearly a half of their original size in spite of the vast amount of food they had eaten.

"There's no doubt about it now," Ross said to Hopper as he showed the corpses to his friend when he came in. "The rate of katabolism is increased so greatly that the animal dies of old age within a short time. In other words, one of the main causes of senility is heavy water and its chemical effect on metabolism, or the rate of change in the protoplasm, the cells, the vascular, muscular, and nervous systems of the body.

"The oxygen consumed, for the liberation of energy, of course, by this rat," he prodded a dissected cadaver, "was sixty-four times the ordinary. As a result, when the rat died, its body was like a shell, with the cells nearly consumed and converted into energy."

"What quantity of heavy water is there in the water we drink?"

"Difficult to say. I'd guess about one billionth part."

"How is it produced in nature?"

Ross spread his hands. "I don't know. The only way I know is by the electrolysis of water. When water is broken down into oxygen and hydrogen, there is a tiny residue of water left at the bottom of the tank; that amounts, as I told you before, to about one ounce to ten thousand gallons. That's heavy water, an isotope of water; water with a higher valence—or more electrons—than ordinary *aqua pura*. Lightning perhaps produces it."

He tapped Hopper on the shoulder to impress his point.

"I've found one isotope of water that increases the rate of metabolism. Science isn't so much interested in deadly discoveries as in the discovery of materials that increase life expectancy.

"What I mean is, since there's an isotope of water that increases katabolism, there's no reason why there shouldn't be an isotope that increases anabolism. An isotope that makes practically for immortality"

Hopper raised his eyebrows in astonishment. "That doesn't follow," he objected. "Poison kills, but it doesn't mean that another form of the poison will cure."

"No," Ross agreed. "But it doesn't mean that it can't."

III.

FINCH gave the order to empty the tanks, and several gallons—the exact number will never be known—emptied into the creek Ross had discovered that one ten thousandth of a minim was fatal to a rat within ten days; he calculated that the same quantity would be fatal to a human being, of average health, over a period of perhaps two to three months. It was almost impossible for him to judge the exact smallest amount that would kill, since he cut down the dose to nearly nothing, with the resulting death of the rat a few weeks later.

Pure water contains one billionth part of a minim of heavy water to one minim of normal water. If the poison was cumulative—and it must have been—continued drinking of pure water in an average lifetime would bring the ratio down to perhaps one hundredth thousandth part to one of water—in the body. It may be that this amount is fatal, by increasing the katabolic rate, consuming the photoplasm, thus causing senility and consequent death.

FOR SIX WEEKS the water of New York contained approximately a twenty thousandth part of heavy water.

Finch telephoned Naughton from the nearest village.

"We've finished our part of the business," he said brusquely. "Got two million feet of oxygen and hydrogen at three atmospheres—forty-five pounds."

"Each?" Naughton quavered.

"No." Finch was impatient. "Altogether."

"That's an awful lot of gas, isn't it?"

"Yeah, as it is now, but Hannon wants to have it liquified. It won't be much more than a couple of hundred gallons or so. We're having some trucks from the city cart it in. We'll see you soon's we're through."

He then called an obscure little trucking outfit in the upper Bronx and arranged for five trucks to arrive early in the morning. Then he and Hannon and the assistant, Santos, spent the night in drinking. Nor were they sober during the two and a half days it took to transport all the gas tanks to the railway station, thence to New York

"How's the work on the rocket coming along?" Hannon asked Naughton.

Finch was still embarrassed by the luxurious home and found his tongue unwilling to move, other than to lick his lips

"I gave the contract to Regan's, out in Pennsylvania. They've done confidential work for me before. The whole factory's working full blast. They promise to have the parts cut and the stuff freighted anywhere we want it, and take care of the assembling, within less than a month."

"That's not bad," Finch managed to say.

"Not bad?" Hannon echoed. "I'd say it was excellent. A lot of the work is absolutely revolutionary It must be giving them a lot of trouble."

Naughton stood up and paced the floor restlessly. "That's what they said. They're a bit skeptical" He laughed shortly. "But let's forget that for a while I feel hungry. Don't you?"

He led them into the dining room and ordered the chef to cook an entire meal. His appetite was enormous There were seven courses, complete dinners in themselves, yet he ate double portions of each course.

"I can't understand it," he said puzzledly, pushing his chair back. "Until only last week I used to fight to make myself eat two light meals a day. And now the cook has to be prepared for anything I eat anywhere from five to eight very heavy meals in one day. What's more, my appetite seems to be growing, instead of slackening."

"Did you ask the doctor about it?" Hannon asked boredly.

"Yes. He says he's doing the same thing, and all his patients are eating tremendous amounts But I feel well —never felt better in my life. He advised me to exercise a lot. Can't help doing ten times as much work—physical work—as I've ever done Something seems to keep me on the go I can't keep still a minute. Something in the air, I suppose."

THE DAY after that, Hannon and Finch went to Pennsylvania to interview Regan. The trip took four and a half hours, during which time they had to eat three times. The waiter admitted that the New York passengers invariably ate the entire stock of food; but Pennsylvania passengers ate normally. When leaving New York, he found it necessary to snatch bites while serving

"Naughton is a wealthy man," Hannon said to Regan, as the three of them sat in the office of the steel plant

Regan nodded. "He could buy and sell a hundred plants like mine."

"Well, then," Hannon went on, biting the end of an expensive cigar, "I'd like you to add about half again the cost to his bills that you render him and pay me half of that sum for professional advice."

Regan looked annoyed. He got up and drew a glass of iced spring water from the refrigerator stand.

"I think it's coming to me," Hannon pursued. "The plans were mine."

"And what plans!" Regan said bitterly, halting the glass halfway to his mouth.

"What's the difference? You wouldn't have got the contract if it hadn't been for them. I think it's the only decent thing to do."

Regan turned suddenly. "I want to get something to eat."

"I want this thing settled first," Hannon said menacingly.

"Let's consider it settled, then, and come down to the restaurant with me. I want a broiled cow and fifty pounds of spaghetti"

"I'd rather have mine roasted," Finch said

And he looked as if he meant it.

IV.

HOPPER rushed into Ross' laboratory. Unable to speak, he threw a newspaper down before his friend and motioned with his hand for him to read a pencil-marked article.

> Due to an unprecedented demand for foodstuffs, New York City may suffer from a serious food shortage in the not-far-distant future, unless the demand is checked soon, or the supply can be found to meet it.
>
> Dr. Richter, of the Food Commission, alleges that the amount of food now consumed daily in New York City is approximately ten times what it was a week ago The West is not as jubilant over this news as might be imagined, since the drought this year destroyed more than half the expected crop, and all meats are far below even normal demand Dr. Richter implied that our food supply may have to be increased by foreign meats and wheat
>
> At present, the markets are stocked for three days at the most, unless the amazing consumption of food decreases Ships are being rushed from Argentina and the South, and trains from the West
>
> It is expected that, although the city may suffer slightly for a short while, the reenforced supply should arrive in four days Meanwhile, the Food Commission asks that all persons try to eat a reasonable amount. The Health Commission joins them in warning of the dangers of such deleterious gorging.
>
> The Board of Health is busily investigating the causes of the alarming increase in appetite and promises developments shortly

Ross held the paper numbly

"Does it mean what I think it does?" Hopper demanded.

Ross nodded slowly. He stared at the rows of empty rat cages.

"How long will it take?" Hopper asked softly.

"I don't know. Weeks—maybe months." He gripped his friend's sleeve. "How's your appetite?"

"Enormous!"

"Mine, too. Listen—don't drink any water. Do you hear? Don't drink any water! And we have to see the Board of Health and warn them. Do you know any men on it?"

"A few, but they're not very important."

"Do you know Paul Naughton?"

"Yes. He practically supports our science departments."

"I want to see him. Can you arrange it for to-night?"

Hopper silently led the way up the stairs from the cellar to the hall of the run-down boarding house. He picked up the phone and asked for a number. At first there was a bit of trouble in connecting with Naughton himself; the secretary insisted that Hopper wait until the financier cleared his desk, but as soon as Hopper gave his name and position, the way was cleared instantly.

"Hello, Mr. Naughton?" he asked. "This is Dr. Hopper, of the university. May I see you to-night about something extremely important?"

"Ask him how his appetite is?" Ross whispered.

Hopper shook his head impatiently at Ross. "You can see me right away? Excellent! I'll be over immediately."

Before he could hang up, Ross had dashed into his room for his coat and hat. He came out on the run, dragging Hopper with him. In the street he hailed a cab, and they drove all the way down from 67th Street to Wall Street. They missed death by inches several times.

Ross jumped out, forgetting the fare. Just behind him trailed Hopper, and the taxi driver on his heels, yelling for his money. The elevator door closed in the driver's face. He stood, screaming invectives after them.

Naughton greeted them personally. He led them into his office, shuffling painfully ahead of them.

"How's your appetite?" Ross blurted out before they even sat down.

Naughton shrugged. "Very poor," he admitted. "And only yesterday I ate seven huge meals. I can't understand it. This morning I had a glass of orange juice, coffee, and when I started on the rolls I lost my appetite. Yesterday I had tomato juice, four eggs, bacon and liver, half a loaf of bread, and three cups of coffee."

"That's a good meal," Hopper said. "But I beat you out by two steaks and an extra helping of potatoes."

"Can you imagine why you used to eat so much?" Ross inquired.

"The air, perhaps," Naughton ventured. "And I've been doing more exercise and physical labor than ever before."

Ross shook his head.

"Is that what you came here to tell me?"

"Yes." Ross leaned forward, tapping Naughton's knee for emphasis. "The cells of your body have been breaking down more rapidly than they could build themselves up. That's what's known as katabolism—the combustion of the cells. Now, in order to break the cells down so rapidly, you were driving yourself at a tremendous rate; consequently, in order to repair the damage done, you had to eat extraordinary amounts of food. Still, no matter how much you ate, you could never build the cells up as quickly as you tore them down."

"I'm still breaking down cells, ain't I?" Naughton asked anxiously.

"You certainly are."

"Then why ain't I eating so much?"

"Because you've reached senility—old age."

"Me?" Naughton echoed incredulously. "I'm only fifty-seven years old"

Ross shook his head pityingly. "You're every bit of seventy-five."

"But I was born in 1897. How can I be seventy-five?" Naughton objected.

"Easily enough. Your metabolism rate has been speeded up so much, you've lived eighteen katabolic years in a couple of weeks."

"Then I'll die soon, won't I?" the financier quavered.

His skinny, heavily veined hands shook tremulously. The once-proud, powerful head was sunken and wrinkled deeply.

"It won't be long now."

Naughton stumbled to his feet as quickly as he could. He grasped Ross' arm weakly. "Lord, man, do something! Don't let me die!"

"That's what I'm here for."

"What do you want in return?"

"An unlimited draft on your bank account—a million, or ten million—or your whole fortune. I want a lab equipped with the finest, most complete apparatus, manned by the best chemists, physicists, bacteriologists, and routine mathematicians you can find. You'll get them from behind taxi steering wheels and soda fountains—all you want."

"Well, what do I get?" Naughton asked anxiously

"A bit of advice," Ross snapped back. "Don't drink any water, even if you have to drink yourself blind with alcohol to avoid water. And another thing I want—introduce me to the Board of Health immediately. Have the whole board present when I speak to them."

Naughton agreed; and as he led them to the door, he said. "I'll have my car call for you this afternoon." Ross heard him mumble to himself: "He's right. I feel every bit of seventy-five."

V.

THE EVENING papers contained two full pages of obituaries, closely spaced in small type. Some one was tactless enough to leave a newspaper lying open on a desk at the obituary columns as Naughton, Ross, and Hopper entered the offices of the Board of Health.

The financier turned pale as his eyes scanned the list. In almost every case death was due to heart failure—senility; and he had known the greater number of the socially and financially prominent people—dead, now.

The day before, he had eaten with Remington and George Billings. All three ate with gusto. Remington and Billings, though over seventy, looked robust and hearty; he never suspected they would be dead a day later. And Ross had said it wouldn't be long now, for him

He could easily believe that, feeling as he did.

A wave of panic shook him. His only salvation was Ross, even if he had to lose his entire fortune. What good would money do him if he was dead? He hoped, nevertheless, that Ross would save him and leave him some money also. In fact, he couldn't see much advantage in living without money. Perhaps, he conceded to himself when he grew calmer, it was because he had never been in that position; it might even be interesting not to know where his next meal was coming from.

That was unimportant, he reflected He was reduced to drinking milk, sometimes with a bit of cracker broken in It was as much as his poor, shriveled, aging stomach could hold.

THERE were eight men in all, sitting around the long conference table—the health commissioner, four of the board of directors, Ross, Naughton, and Hopper. Six directors had died the day be-

fore; the others were close to sixty, and looked seventy or more. They looked as if they felt it.

"Before you start, Dr. Ross," Health Commissioner Gordon said, "it's my opinion that there is nothing you can do about the alarming number of deaths in the city. The majority of those who died within the last day or so were people over seventy years of age, and their deaths were entirely due to normal conditions; in other words, they suffered from heart failure, which means senility overcame them, and they died peacefully. There is nothing you can do about heart failure."

Ross stood up, resting his weight on his hands and leaning seriously over the table. His face was drawn and haggard.

"That's my first point. Apparently people will always die of old age; they have so far, at least. But there *is* something we can do to check senility, prevent too rapid katabolism. I suppose you know that's what caused this," and he pointed to the list of obituaries.

"About ten or eleven years ago a scientist discovered an isotope of water which had a greater valence than ordinary water. He found that rats, given this heavy water, died within a few minutes.

"Heavy water is produced by the electrolysis of water. After oxygen and hydrogen are given off, a small quantity of water is found at the bottom of the tank. The process of electrolysis has in some way added more electrons to the water than there should normally be. So, instead of the formula being H_2O, it is more like H_4O_2. That's heavy water.

"The chemical nature is as yet unknown. We can only assume that in some mysterious way it reacts with the cells of the body to produce a greater chemical reaction than usually is the case with normal water. The energy given off by the combination of heavy water and the body cells is that produced by the breaking down of the cells. The result is an increase of katabolism and swifter old age. Senility and heart failure soon follow."

There was silence for a while.

"So you blame these deaths on our drinking water?" one asked.

"That's right," Ross acknowledged.

The commissioner puffed with indignation. "The drinking water of New York City is unequaled for purity."

"I agree with you," Ross returned quietly. "Every germ is dead of old age. Never have we had such pure water on such a large scale. And, what's more, I don't want it."

The commissioner sneered politely. "So you suggest what?"

"That every one in New York stop drinking water."

"How about boiled water, or distilled water?" a director asked.

"What do you expect boiling or distilling to do?" Ross returned patiently. "Kill the heavy water?" He shook his head slowly, from side to side. "It'll only make it taste flat, and make the water not only deadly but unpleasant."

"Then, according to your theory, we have to condemn three hundred billion gallons of expensive water and make the city suffer from drought."

"You have the idea perfectly."

"It's preposterous! We'd kill off more by thirst."

"There are substitutes," Ross pointed out.

"Such as?"

"Bottled water from outside the State; soda pop, provided it isn't made in New York; alcoholic beverages——"

"But not enough of them, and they cost too much money for the poorer people."

"The city could take over the companies temporarily."

"They couldn't."

"Why not?"

The commissioner turned brusquely away. "Let's consider the matter

dropped. I'm convinced your theory is wrong and too expensive to be practicable."

"You're committing suicide by your bullheadedness!" Naughton shouted hotly. "What do you know about the matter?"

"Do you know any more about it?" Gordon retorted.

"No; but Ross does. If you weren't an ignorant ass, you'd know about it, too."

"I'm not interested in that. I know enough about medicine to realize metabolism cannot be speeded up by ordinary water."

"I didn't say it was ordinary water," Ross cried savagely.

"Heavy water, then. It's the same thing in the end."

"I'll have you thrown out, you fool!" Naughton bellowed.

Hopper pounded on the table with a heavy book. "We're acting like a bunch of children. Stop it and listen to reason!"

Ross walked around the table to Gordon and held out his hand. "I'm sorry. We'll never get anywhere like this."

"I'm sorry, too. But, really, you can't expect me to cut off the water supply, just like that," and he snapped his fingers. "It can't be done. For one thing, we can't get another supply for years, to compensate. And, another thing, I haven't got the power."

"Then what can you do?" Ross demanded.

Gordon shrugged. "The best I can offer is an announcement in the newspapers saying the Board of Health believes the deaths are partly due to an abnormal condition of the drinking water and suggests that everybody stop drinking it."

"That's not very helpful, but I guess it's the best we can expect," Ross said bitterly.

They were met at the door by screams of rage

"How about my fare, you dirty lugs!"

"Don't worry about your money. You won't have it long," Naughton advised, handing him ten dollars.

The cabby grinned and touched his cap respectfully.

"That's the truth, sir." He laughed. "I got three kids, and they sure eat up the dough."

THE PAPERS that night contained the article on the front page. In it, Health Commissioner Gordon informed the population of New York City that a certain Dr. Ross believed the recent deaths were due to an "abnormal condition of the drinking water." Ten other doctors thought they were caused by food, riotous living, and various incidental occupations; and hundreds of famous physicians agreed with Dr. Gordon when he publicly stated his belief that the deaths were entirely normal and that nothing was to be feared.

If there was, the Board of Health, in a gently ironic tone, thought it was capable of handling the "abnormal situation" as competently as it had done in the past.

The thought, though, was ridiculous. Humorously, the article ended: "People *will* die of old age, you know."

VI.

THE ROUTINE manner in which the Board of Health handled Ross' theory produced the expected results. People laughed and drank as much water as they had been accustomed to drink. Ross telephoned Dr. Gordon at his home and warned him not to drink any New York supply water.

"It's been my custom all through my life to drink at least six glasses of *aqua pura* a day," Gordon replied coldly and hung up.

Apparently he did heed Ross' advice to a certain extent, for he lived a full

week longer than the other members of the board.

Naughton insisted on reporting his physical condition to Ross every day. He drank no New York water, and, though he noticed no improvement, neither was there any aggravation of his slow aging.

His interest in the laboratory that Ross and Hopper were putting together was pathetic; as soon as he could get rid of the day's work, he tore down to the loft on Park Place and watched the truck drivers haul the heavy apparatus into the huge room and connect it to the powerful step-up system. The drivers were patient, but he possessed the knack of getting in everybody's way, no matter where he stood.

His confidence in Ross and Hopper was surpassed only by his awe of the machines. If he was forced to admit it, he would probably say that his confidence lay more in the machines than in the men.

Machines are infallible——

Machines look more scientific——

He stood silent in the long, crudely constructed, raftered loft and let his gaze travel from one machine to another. They stood like philosophic sentinels of mankind's last outposts, containing without exertion the bottled wisdom of humanity, and straining politely to be off at the task of saving their makers.

Naughton was an incurable romantic.

VII.

PETE SLOAN took a shot of rye and stood up, filled with determination. The clack of typewriters unnerved him for the first time since he had joined the sports department of the newspaper nine years before. He sat down again, poured himself a steep shot, and threw it down his throat with practiced skill. It tasted excellent, even though it was early in the morning. He threw down six more.

When he felt he was sufficiently fortified, he staggered through the maze of desks to the publisher's office. Without knocking, he entered. Nothing but pink elephants could have scared him.

Locke, the publisher, looked up. He was expecting something of the sort.

"Good morning, Sloane!" he greeted his columnist-editor cheerfully.

"Hello!" He stood sullenly until Locke asked him to sit down.

"Something wrong?"

Sloane nodded, a rapid, dizzying movement of his head. "I want to get out of the sports section."

"Why?"

"Oh, I don't know." Sloane waved his hand negligently. "Several reasons —I'm fed up with sports. Same thing every year—no change, no future. One year the Athletics win; next year they have to play again. I get so I want one ball team to win and keep the damned pennant instead of having to play a string of games again next year. Boxers are bums. Wrestlers are bigger bums. Football players haven't enough brains to know when they're hungry. And I'm the biggest bum because I have to make my living off them."

Locke let his gaze stray from Sloane to the golden-oak paneling of the spacious office. "We can't demote you to be a reporter. You're our sports editor, you know."

"I don't care where you put me!" Sloane cried savagely. "Give another man a break. Put me on your book reviews, or plays. I don't care where you put me.'"

Locke smiled pityingly. He saw the break-up of a good man.

"What experience have you got in reviewing?" he asked softly.

"Well——" Sloane twisted in embarrassment. "I started taking a course at the university yesterday."

"That's hardly enough experience, I

think; and you have to agree with me. Reviewing takes some years. You're at the top of your line, so why start in on a new field at this time of life?"

"I told you why," Sloane insisted glumly.

"Tell you what I'll do. Suppose you keep on with your course in reviewing at college, and meanwhile stick to the editorship. Then, when we feel you can step in and take over our reviews, and when we've had time to find another man to take your place, we'll demote you to books. You'll find the salary disappointing, I warn you."

He rustled through the papers on his desk. Sloane recognized dismissal.

"I want you to cover the King Britt-Lefty Young fight to-night," Locke called after him. "And don't try to send any one else."

Sloane turned around at the door and protested shakily: "But Britt is a stupid lug that never could fight, and Young was born punch drunk. This fight isn't worth a dime."

Locke ignored his argument. With an overpowering consciousness of defeat, Sloane stepped out into the riotous general office He realized that if he hadn't been drunk, he probably would have won his point. He picked up a reporter leaving on an assignment, and together they weaved toward the nearest bar

THERE is nothing like rye to protect one's finer sensibilities against a rank fight Sloane finished off a pint, but at the last preliminary, he felt an all-consuming desire to eat.

"I'm going to get something to eat," he said to his telegrapher.

"Bring me back a dozen sandwiches."

With a rush that would have done credit to a varsity tackle, Sloane elbowed through the mob bent on the same task. He ate two whole chickens in record time and returned with the dozen sandwiches just as the main bout was being announced.

Judging from the appearance of the two fighters, Sloane's description of them to Locke was more than just. Britt was a brawny lump of brainless muscle, with a gigantic jaw and practically no forehead, "Lefty" Young was squat, clumsy, and battered into an ugly memento of former fights.

They danced in their corners, limbering up with consummate awkwardness. Sloane had seen them fight before. It was his prediction that both would die, in the middle of the bout, of sheer unworthiness to live. The unprintable way he phrased it would have made his journalism professor applaud; he vaulted over figures of speech and climbed under adjectives.

Hastily they touched gloves and stepped backward at the sound of the gong. Young led with a cream-puff left that scarcely brushed aside the air. Britt seemed to be engaged in recalling several sections of the Koran. When he snapped out of it, it was just in time to receive a light blow on the chest. He went down, screaming foul

Nobody in the audience made a sound He got up, blushing with embarrassment. Young looked sympathetic.

After that there wasn't much excitement.

During the sixth round both men suddenly refused to fight unless they were fed. There was a ten-minute pause while they ate broiled-steak sandwiches and coffee.

A shriek ripped through the air, directly behind Sloane. He flashed around. A man was slumped down in his seat, his head lolling idly against a woman's shoulder. She was screaming at the top of her voice

At the same instant, Britt fell against Young in a loose-jointed clinch Young held him up, meanwhile battering his sides. The referee jumped in and

pushed them apart. Britt dropped to the floor.

In all, nine died in the audience that night; with Britt it made ten, and Young followed two days later.

The coroner called it heart failure. Sloane discovered he meant senility; and, in the crusade that followed, his paper demanded that the boxing commission examine its fighters.

Not only the boxers, but also wrestlers, baseball players, swimmers, trackmen—athletes in every sport—were declared unfit to play. The papers went further—they reported the athletes in New York as suffering from old age.

The scandal was disgraceful. New York sports hung their heads.

VIII.

NOT MUCH thought was given to the phenomenon. People were accustomed to seeing their friends age ten or more years in those few weeks. In cases where they had not seen each other for some time, the transition was so brutally abrupt, it could not but be noticed.

But ordinarily they saw their friends and acquaintances nearly every day, and the swift aging was not so apparent. When it was thought about it all, it was generally attributed to the fast life and great financial worry amid which that generation lived.

Had it been any other city but New York, the idea would have been laughed down.

The first indication of alarm occurred on September 10th, fifteen days after Finch gave his order to empty the tanks.

Miss Agnes Cunningham, gray-haired, extremely stout, aged fifty-two years, entered her classroom in the morning of the first day of the fall term. She had taught second-year children for thirty years; with the result that she knew what the average, normal seven-and-eight-year-old child should look like and how he should behave.

Consequently, as she seated herself behind her desk and adjusted her thick-lensed glasses on her stubby nose and peered shortsightedly at the children, she was taken aback. Immediately she suspected either a mix-up or a practical joke. Her fear of practical jokes was even as great as her fear of burglars, the principal, or Board of Education inspectors. A mix-up could be corrected; a joke would offend her dignity, that surrounded her like a suffocating mantle.

Legs squeezed into the tiny space provided for small children, crammed into the low, small seats, her students watched her uncomfortably. The boys needed shaves; the girls were developing rapidly into mature women.

Miss Cunningham determined to handle the situation expertly, despite her bewilderment. With only the tiniest tremor in her voice, she called off the roll that had been given her. The children replied in mature voices; only a few of the boys still retained a childish treble.

Something, Miss Cunningham knew, was wrong. Yet there was a test that would show beyond doubt whether she was being imposed upon. She waddled down the aisles, distributing paper to the children, and asked them to write their names.

Then she sat down again, tapping her foot angrily and waiting impatiently for them to finish. The pupils were well-behaved, healthy, and there were surprisingly few grins or giggles; but they weren't the usual seven-and-eight-year-old boys and girls given to her to teach.

She collected the papers, yanking them off the desks, and rushed back to look startled at them.

They were written in the sprawling, painfully formed handwriting she would expect of the average second-year pupil. Hastily, she jumped up and ran out of

the room, without appointing a monitor.

"There's been some mistake," she said breathlessly to the principal.

"What do you mean?" he demanded.

"A mistake," she repeated. "Come with me."

He followed, mumbling under his breath. There was nothing he hated more than women teachers.

"There!" Miss Cunningham pointed triumphantly at her weird class

"What year class is this?" the principal asked, looking around suspiciously.

"2B The last term of the second year."

"Do they answer the roll call correctly?"

Miss Cunningham nodded. "And what's more," she added, "look at the handwriting"

The principal glanced at the names scrawled at the tops of the papers. He looked dazedly from them to the children and back again

"Have you any intelligence tests on hand?" he asked hoarsely.

"Yes"

"Well, then, give them to the class. We'll clear this thing up, or I'll know the reason why."

Judging from the answers to the various questions, the children were undeniably seven and eight years old, despite their matured bodies. Their reactions were sufficiently childish to justify their being placed in the second-year class. Miss Cunningham resigned herself to the oddity of teaching second-year children with mature bodies.

All over the city teachers were being forced to do the same It was predicted that the children had the desires the maturity of their bodies would warrant.

It was the first serious indication of the effect of heavy water.

IX.

BEFORE this, on the 6th of September, Bourne. Rex Brown and Wiggam filed into Naughton's office in the morning at ten o'clock. Tense, nervous with some new excitement, they sat down in the deep leather chairs and faced Naughton impatiently. They represented over a billion in securities and cash and perhaps five billion dollars in credit. For many years the stock market knew their influence; they made or broke the market, at will.

"We want you to come in with us," Rex Brown snapped, scarcely before his chair had stopped creaking under his bulk.

"On what?" Naughton asked sharply. He felt in wonderful physical condition; it was before the lapse into senility.

Bourne motioned to Rex Brown to permit him to do the talking. "We want to corner the food market"

"It's a bit late, isn't it?" Naughton objected.

Wiggam and Rex Brown shook their heads violently Both were grossly fat and bald.

"Just the right time to break in," Wiggam rasped.

"It's the custom of our affiliation, you will recall," Bourne interrupted calmly, "to permit the conditions sufficient time to determine whether speculation is reasonably certain of success. It is our belief that the demand for food will continue for some time, at least."

Naughton stared at Bourne. The man never failed to astound him with his incredible pompousness and the ridiculously roundabout way he had of presenting a simple plan in the most complex manner.

"You can't tie up the American crops," Naughton suggested. "They're bought up long ago by the bulls. Besides, the government may not permit tampering with the price of foodstuffs."

Wiggam laughed down the idea. "We've got enough money here to buy and sell the government."

"That may be true," Naughton re-

turned, "and it may not. The point is, if the demand suddenly slackens, we'll be left holding millions of dollars' worth of food."

"Forget it," Wiggam rasped harshly, spilling a long cone of ashes on his checkered vest. "We've got billions to make. We stand to lose only a few millions."

Rex Brown rose and searched through Naughton's desk until he found a bottle of whisky. He lifted it to his lips and drank deeply. The powerful stuff made him gasp, but he smacked his lips and put the bottle back in its private drawer.

"The Western crops don't amount to much," he said, turning and walking back to his chair. "They probably won't last more than a few months, even in normal conditions. Like this, they can't hold up longer than a week. You know how the price of domestic meat has jumped."

Bourne edged closer to the desk. He pulled out a pencil and scored his points on the beautifully polished surface.

"Here is our plan: There is a tremendous surplus of Australian and Argentine meat and grain. The stuff can be bought for almost nothing. I'll go down to the Argentine, and Rex can go to Australia, and between the two of us we can buy up nearly the whole amount."

"But it's just New York that's eating so much," Naughton put in.

"Yes; and it's eating so much, there won't be anything left for the rest of the country."

"That's the point," Bourne emphasized. "We may have to hold the stuff longer than usual, but we'll get back a lot more than our investment."

"That means storage."

"Right! It also means we can force the country into accepting our premium prices. We can easily do it, too."

Naughton pursed his lips thoughtfully. "How much cash will it involve —immediately, that is?"

"About ten millions."

"Including transportation and storage?"

"No. Just the buying. I don't think it'll run that high, even," Rex Brown answered. "We'll buy on fairly long terms, and pay out of the receipts when they come rolling in. It'll be a layout of almost nothing, but an investment over a period of about four or five months of something like three hundred millions. That'll come out of the profits."

"In that case you can count me in," Naughton said. "My advice, though, is to wait until it looks as if the demand for food will continue strong for a few months."

Bourne stood up. "Getting down there and sending up the food will take a week from the Argentine and three weeks from Australia. We shall accelerate matters as much as we can, by taking planes to the places, and by not being too particular about the quality of the materials. That should be enough time to determine whether the demand remains constant, I believe."

"What about liabilities?" Naughton asked anxiously as they turned to leave.

"We've formed a corporation already. You should have known us better than to think we'd forget such an important point," Bourne scolded him gently. "We are the 'Essential Foods, Inc.'"

AFTER they left, Naughton covered a page of foolscap with figures. He ate seven, and sometimes eight, meals a day. That meant approximately ten pounds of various foods. He estimated that the ten million persons in New York City ate about the same amount. If that was so, then seven hundred million pounds of food were consumed daily in the city. More than that; the demand showed no signs of slackening; at such a rate of food consumption the total American supply would soon be

exhausted, particularly since it was so small that year.

Judged from any point of view, they were protected even if the city's appetite returned to normal, for there would be very little food left for the rest of the country. Thus far the prices were being held down by government control. But let the four of them store away their supplies until the country was desperate, and the government would meet any price they demanded.

There could be nothing else for the government to do, Naughton reflected happily. The Essential Foods, Inc. would be a monopoly—the most powerful monopoly the world had ever seen; nothing could touch it or restrict the prices it should demand; if refused, they were able to hold out longer than the starved country, which could get relief from no other country in the world.

They would have the total surplus crops of the earth.

It was more power than Naughton had ever dreamed of for himself. The greatest emperor or conqueror had never held so completely in his control the destiny of the world.

Naughton needed no alcoholic stimulant for days.

X.

THE UNITED FRONT hired the Labor Hall on 14th Street for the evening of September 24th. Word passed around in that curiously bodiless way, as though it whispered from the air instead of from one person to another, that on the evening of the 24th the lid would blow off. It might even, conceivably, be the beginning of the millennium, though no hint of active revolution was given.

The reservation for the hall had been made early in July.

It was stiflingly hot; the smell of sweat and tobacco made the heavy, motionless air more oppressive. Three thousand men and women were pressed into the small auditorium, which ordinarily seated a thousand. A buzz of conversation was audible, but the usual loud arguments were missing. Moreover, everybody was on time, with the result that the committee, accustomed to unreasonable tardiness, found itself in a predicament.

While the speaker was being rushed to the hall, the audience had to be entertained; otherwise they would be bound to get into separate fights that eventually would cause a mass fight and trouble with the police.

Thus far, the audience was remarkably well-behaved. The management, pleased with the reformation, granted the party the privacy they had begged for and withdrew. Just as pleased with the serious demeanor of the crowd, the committee hoped it was due to the seriousness of the matter that brought them together that evening. True, they hadn't hinted very clearly at the subject, but the party was accustomed to reading between the lines; the vaguest message held a meaning for them.

Within ten minutes, the speaker, still buttoning his painfully tight collar and pulling his tie into place, found himself swept up on the platform before an astoundingly eager, yet polite, assembly.

Zack Brian was a man of thirty-one; he looked fifty-five. It was not due to dissipation, for he was known for clean living.

The audience contained no more than fifty people over forty. They all appeared to be as old as the speaker looked.

"What is this—a gag?" Brian demanded angrily.

The audience felt the same way about being addressed by a middle-aged man. They were more restrained in expressing their views, however, and restricted themselves to ignoring the man.

"This is our regular party," the chairman retorted. "Get ready to

speak; I'll quiet them down."

He stood up before the crowd and held out his hands for silence.

"Comrade Brian, who is well-known to all of us through his works, has a plan he wants to talk over with you. The committee has discussed it with him and believes it to be practicable Give him your attention."

Brian faced his audience. It was obvious that he still refused to believe he was addressing the regular party; nevertheless, he began with his customary fiery manner of delivery.

"Comrades," he bellowed, "we have waited too long, waited patiently for the world to see the light. It has failed to come. Pacifistic measures, propaganda, and education have failed to achieve what can be brought about only by force Our speakers are hooted and laughed at by the capitalists. Propaganda is simply ignored.

"We have long realized the truth; the world lacks sufficient intelligence to adopt our program of its own accord. It must be forced on the people, even on the proletariat.

"It remains for the rest of the United Front to adopt our policy of active revolution.

"Your committee has listened to my plan of action, and, as a result, we have appointed the twenty-eighth of this month to be the day of revolution. Briefly, the plan is this:

"Small bands of men shall invade the police stations in every city in the United States. Heavily armed, they shall cover the police while their comrades disarm them The jails can be utilized for holding the men, to protect the bands from being rushed by militia and regulars who can be warned by the police if given the chance.

"At the same instant, there will be a coup d'etat in Washington. A group of men will seek an audience with the President; they will have with them a number of well-known foreign diplomats, thus they will avoid being searched for weapons When the President enters the room with his guard, the entire group will be seized and held prisoners Meanwhile, every Congressman in Washington will be captured

"Then, under coercion, they will grant a dictatorship to any man we select By commandeering the army, the navy, and the State militia, we can hold the rest of the world at bay, with Russia's aid. I doubt if there will be any such difficulty, since, with our affiliations, the balance of power is greatly in our favor.

"It will be the duty of the rest of our party to select a man worthy of the office of dictator and to overpower every policeman on the streets after noon, September 28th. Roving bands will accomplish this."

A man in the fourth row jumped up suddenly and, in a deep, powerful voice that drowned out Brian's rolling bass, cried loudly enough to be heard over the entire hall:

"I'm twenty-two, and I look and feel like a man of forty-five, The rest of the party is in the same predicament. I don't think we can go through with it in the physical condition we're in now"

Brian drew the back of his hand across his eyes. "I don't think I could, either," he said wearily.

The audience filed slowly out of the hall, silently, without a single word Brian sat down and stared at the floor. His broad shoulders were sagging like an old man's,

The youth movement was dead—of old age

XI

ON THE afternoon of the 25th of September, the thermometer dropped to sixty-two degrees By nightfall, the supply of overcoats was exhausted People huddled along the streets, hugging their coats tightly about them The

wind whistled gleefully between the buildings.

And that night Naughton was visited by Bourne, Rex Brown, and Wiggam. In a moment of pity at seeing them growing old and feeble, Naughton had warned them against drinking water, though he hated them intensely. They took his advice, and thus they grew no older.

"We cleaned up on the first shipment of food," Rex Brown gloated. "Our profit is about five hundred per cent—net."

"But we came to speak to you about something else," Bourne said, pouring out drinks and distributing them. He watched Naughton over the brim of his glass as he drank. "I called up the weather bureau and asked whether the cold wave would continue. The man said that, according to their Western reports, the wave would continue definitely."

"So what?" Naughton demanded coldly.

Wiggam shifted uneasily in his chair. He saw objections coming from Naughton; that meant argument, and he preferred direct action rather than persuasion. Besides, Naughton made him feel inferior, with his coolness and aloof attitude, even though Wiggam was richer.

"Simply this," Bourne proposed nervously, "there'll be a great demand for coal and oil this winter. According to a confidential report from the head of the weather bureau, the amount of fuel burned this year will be close to ten times the usual. That's because the cold hits the people more this year than ever before, for some reason or other. We want to buy our way into the fuel outfits and the fur and overcoat businesses. We control most of the imported wool, anyhow, so we'll get the profits from one end to the other."

Naughton sneered, and his sneer was famously vicious. "Do you know what I'm doing?" he shouted hot-headedly. "I'm taking most of my share of the food and distributing it to the poor. Ross told me he knows of people starving to death on three meals a day!"

"Are you crazy?" Wiggam demanded, outraged by this desertion from the ranks. "After our planning, you're going to ruin us."

"No, I won't. I don't expect to live much longer, and whatever more money I get won't help me any. So I'm giving most of the food to the poor. What's more, I want to get in with you on the fuel-and-clothing idea."

"So you can throw away some more money on the poor?"

"Right! I've sold all my speculative stock and invested it in companies that are constructive and need capital."

"You'll wreck the market!" Rex Brown cried.

"I don't care. There's real work to do, and I'm not out for more money. I want to do my share in saving the city."

The market crashed the next day; but worth-while industries were untouched by the pandemonium. Naughton's conservative measure gave them strength to resist the downfall. More, they were able to expand, since wandering capital was attracted to them by Naughton's huge investments, an indication of their stability.

Nonexistent rubber plantations, fake oil wells, worthless railroads pulling along on speculation profits, public utilities' stocks that were watered to saturation, wildcat liquor stocks, rackets, fleecing propositions, and every form of big business skullduggery—all found themselves faced with ruin. In some cases their stocks were deflated even beyond their true value.

America, closely followed by the rest of the world, entered a new era of conservatism. Politics, always out of date and slow to learn, alone attempted to resist the reactionary tidal wave.

PRESIDENT WEBSTER was a modern politician. He served his apprenticeship during the reconstructive period of 1933-1938; consequently he retained the idea of aiding American business by pouring vast sums into public works.

A consummate actor—undoubtedly the best in the land—he knew the value of a charming smile, the feeling of a paternal hand draped over his audience's shoulders while he droned deeply: "My dear, dear friends." He knew that a political speech needed no content of thought as long as it sounded oratorical without being actually platitudinous, and managed to squeeze by without having to kiss babies for newsreels.

Being a politician, he recognized the worth of compromise and favors, particularly when his backers were involved.

Thus, when a pitchblende mine with a fairly high percentage of radium was uncovered in Death Valley on August 29th, he permitted the heads of his party to bid for the land with as little delay and money as possible.

The news, carefully guarded though it was, leaked out to Wall Street in its customary swift manner. At eleven the next morning, the 26th of September, when negotiations were nearly completed for the purchase of the mine, and while reporters were told the President was busily at work on plans for more public works, Webster was roused out of bed by an insistent demand for his presence at the telephone

"This is Naughton," the voice said—rather harshly, it must be admitted.

Webster greeted the financier cordially, despite his former irritation at being summarily ordered from his bed.

"At present I'm speaking for a committee of men who were interested in your climb to the White House," Naughton said. "A plane, bearing a signed list of these men's names attached to a petition, is leaving for Washington immediately. You'll get it within a couple of hours."

"What's it about?" Webster asked anxiously.

"We would like to have you refuse the request of certain business men who are interested in a Death Valley proposition"

"You can speak plainly. This wire can't be tapped."

"Well, since you asked for it, the medical profession has suffered for a long time from a lack of radium. That Death Valley mine can supply quite a bit of radium, according to the mining report. We want you to have the government keep the mine, work it, and sell the radium to our hospitals at cost price."

"That's impossible!" Webster cried. "I haven't the power to dispose of the mine as I see fit."

"No?" Naughton sounded pained "Then we'll have to wait and see what power your successor will have."

Webster recognized the crack of the whip. He became conciliatory; it is unnecessary to say that a group of capitalists discovered a scheme of theirs had suddenly lost its footing.

It did not stop there. The United States ceased its construction of public works that drained the treasury alarmingly. For the first time in decades, the budget was balanced. The tariff was lowered; airplanes, battleships, and other instruments of defense were built to the limit Patriotic restraint of trade was abandoned, to the immeasurable relief of small manufacturers and wholesale and retail business men, who suddenly found themselves making money again, though their cash surpluses were gone.

XII.

TWO OLD MEN, with the aid of walking sticks, slowly entered Naughton's office. One dropped comfortably into a chair on the left side of the finan-

cier's desk, the other perched on the edge of his seat.

Naughton looked up impatiently at them.

"I'm Hannon, and this is Finch, you remember?"

"Well, what about it?" Naughton demanded brusquely.

"We come to tell you that Regan is dead We want you to buy up the plant, so we can fill the contract," Hannon replied smoothly.

"Forget it!" Naughton shouted. "Regan wrote that your plans for the rocket were about as practicable as mine would be. The thing couldn't even be put together, let alone having it reach the planets."

"What did he know about rockets?" Hannon asked coolly.

"I don't care what he did or didn't know. You're wasting my time. You're lucky I'm not bothering to prosecute or——"

"You'd be laughed at again," Hannon warned, reaching out to the cigar box on the desk.

Naughton pulled the box out of his reach. "Get out of my office before I have you thrown out!"

Ross met them on the way out. "Who are they?"

"A couple of the boys," Naughton snapped

"I hear Regan died. He used to do some work for you, didn't he?"

"Yes"

"Do you know what he died of?"

Naughton shook his head tiredly.

"He had a habit of drinking spring water that was bottled at a faucet in the Bronx Pennsylvania water wasn't good enough for him."

"Was that what you came here to tell me?"

"No."

"How're your experiments coming along?"

Ross shrugged. "I don't know yet."

Naughton's shoulders sagged visibly. "When will you know?"

"Takes time. Maybe to-night; maybe never But I wanted to show you a few things, if you have the time."

For answer, Naughton stood up and walked around the desk toward the door. "Will you need the car?"

"Yes. And the chauffeur, too."

They headed downtown, to the East Side Delancey Street was gone; in its place was a broad highway. The tenements had long since been torn down, and the East Side was housed with tall buildings, widely spaced, and clean streets between No dirty pushcarts obstructed the streets, with their litter of discarded, rotten vegetables and assorted symphonies of smells.

But the women were still slovenly and unclean; the children still ran about barefooted, dressed in rags. The contrast of clean buildings and spotless roads made them seem even more dirty and ragged.

"Stop here," Ross ordered the driver. He pointed to a woman slowly rocking a baby carriage into which a child was squeezed, with its knees drawn up and the rest of its body pressed tightly against the sides. "How old do you think they are?" he asked.

The woman was disgustingly fat, with huge hips and rolls of flesh swelling out her dress. Her gray hair straggled in lank wisps along the greasy, wrinkled face She kept pushing the child back into the uncomfortably small carriage every time it insisted on sitting up.

"She must be about fifty," Naughton replied boredly. "And the child seems to be around five years old, judging from its size."

"Doesn't it seem ridiculous to squeeze such a big child into a baby carriage?" Ross pointed out.

"She probably doesn't know any better," Naughton snapped back. "Why are you wasting my time with such nonsense?"

"That woman was married two years ago. She's twenty-four years old and took a B. A. degree at Columbia. The baby is five months old."

Naughton laughed harshly. His flabby face creased into deep folds. "Do I look stupid enough to believe that?"

"It's true, though," Ross returned quietly.

He motioned the driver to go on. Two blocks farther, they passed a bent old man, huddled in a threadbare overcoat as deeply as he could, struggling against the wind.

"That old man is thirty-two years old," Ross remarked. "He is starving to death on three meals a day. Until he began drinking heavy water, he managed to get along without any extreme difficulty. Now the rapid process of metabolism is consuming the energy in every cell of his body, with the result that he looks three times his age. It's too late now to feed him; his teeth and hair have fallen out, and he weighs ninety-eight pounds. In another week he'll die of extreme old age, at thirty-two."*

A tall blond girl, superbly developed, strode down the street. Her pretty, vacuous face was heavily painted, and she wore the thinnest of cloth coats with no discomfort.

"That girl is seven years old," Ross said, as though he were delivering a classroom lecture. "She wants to get married to a nine-year-old boy. He left home and is trying to get a job as a shipping clerk. He weighs one hundred and ninety pounds, is six feet two inches tall, and can throw any man his size."

Naughton stared down as his wrinkled, heavily veined hands and said nothing. Huge freckles of senility covered the scaly backs of them. Not many weeks before he would have offered to wrestle the nine-year-old boy, for he was in excellent condition and at the peak of his physical strength.

XIII.

AT ONE END of the gigantic loft, black dynamos screamed around and around in the ozone-filled air; vast tanks filled the rest of the room, except for the space along the walls, which contained hundreds of cages of rats and laboratory tables equipped with every type of chemical and bacteriological apparatus. The squeals of the rats were drowned completely. Like an ant near a mountain, Ross was dwarfed by his huge machines.

Madly rushing, the sound of water poured into the tanks.

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*According to Lusk, fifty-eight per cent of the protein molecule can be converted into sugar, in certain conditions, seldom encountered in the body cells, he adds. With the aid of heavy water, fifty-eight per cent actually is converted into sugar, as shown by the work of Dr. Krotz, of New York, who lived during the heavy-water era and delved ceaselessly and intelligently into this problem. Cadavers, dead of senility induced by heavy water, possessed twelve times the normal quantity of insulin, he found.

As the body demanded more carbohydrates than any other foodstuff, and the enormous amount of insulin was sufficient to cope with it, the energy liberated—for a short time, at least—must have been gigantic.

Carbohydrates are generally stored as fat, when not utilized immediately, and reconverted into carbohydrates when needed; a certain part of this is transformed to sugar, and the action of insulin upon it—precisely how it is done is unknown—releases the energy contained therein. The energy liberated depends on the ratio of insulin to sugar. As the body, in the conditions imposed by heavy water, held twelve times the normal amount of insulin, and the vast quantity of carbohydrates ingested was converted almost instantly to energy, it is understood, of course, that this is analogous to complete combustion.

When this is understood, the realization that after the recently ingested carbohydrates were converted into carbon dioxide and water, with subsequent release of energy, the fat which had been stored up in the body for years was also consumed, the result is easily imagined: there was alarming reduction in weight, height, and strength.—C. C. C.

Supported on a pygmy's arm, another pygmy hobbled anxiously between the rows of tanks, and met another pygmy who was staring up at the bubbling, splashing tanks. They gestured impotently at each other. Motioning to the others, the third man led the way to a tiny office at one end of the room. The old man, desperately fighting his slow, aged legs, struggled to hasten after him.

Ross closed the door against the deafening noise and the irritating, sharp smell of ozone.

"This is Dr. Rand, the new Commissioner of Health," Naughton said in a mad rush of words. "You've got to do something, Ross; and you have to do it mighty quickly."

Ross turned and looked at Rand, whose face was pale and strained with a terrible emotion.

"The city is overrun with an epidemic of every kind of disease," Rand said, and the effort to keep his voice under control was painful. "The incubation period of almost every germ is cut down to a very few minutes, and death results almost instantaneously. Yesterday the City Hospital reported the case of a man who cut his finger quite deeply. He rushed to the hospital, and before they could examine the cut he was dead with lockjaw. The time elapsed from the cutting of the finger to death was twenty-one minutes."

Ross bit his lip until it bled

"Take a look at this," Rand said, drawing several photographs out of a large Manila envelope. They gleamed in the bright lights.

"These are microphotographs of a group of tetanus bacilli, taken at intervals of five seconds each. The incubation period of the tetanus bacillus is twelve to fourteen days."

The group contained a great number of slender, drumstick-shaped rods, growing singly. They were darkly colored.

"The tetanus bacillus is a slender, slightly motile rod, two to five micra in length, and three-sixteenths to eight-tenths of a micra in breadth," Rand informed them. "There are five or six different types, one as deadly as the other. They grow singly, in dark places. The spore at the end, which gives the germ the drumstick appearance, is extremely hard to kill. In fact," he pointed out, "the only way to kill these spores is by subjecting them to a pressure of fifteen pounds of superheated steam for fifteen minutes. They are stained with what is known as the grand positive stain, which gives them a purplish color. They reproduce in the same manner as other bacteria—by division, breaking off into two distinct bacteria.

"Now here," he pointed to the tenth picture, after skimming through the intervening ones, "several of the bacilli are ready to reproduce. You'll notice there are spores at each end, and the middle is growing quite thin, so the germ looks like a dumb-bell filed through the center. In the twelfth picture they've already separated and have formed two distinct bacteria.

"Period of incubation—one hour. Reproduction—a little over three minutes. Start off with ten, and in an hour there are 5,211,080 germs, in two hours, 342,470,804,680 That's starting with a ridiculously low amount, because in the intestines and ejecta of a normal human being there are hundreds of thousands of tetanus bacilla living and breeding, though kept under control by the predatory white corpuscles, helped by the long reproduction period.

"The tetanus bacilli have a remarkable affinity for the human body; they find strikingly suitable dark, moist, warm places to live and breed You know that the human body provides habitation for any number of various disease germs, even during health. But the numbers are small enough not to cause any serious disturbance of the blood-stream balance. It is when they

increase and destroy the white and red corpuscles, and invade the cells of the body, that they become exceedingly dangerous.

"In this epidemic, which includes respiratory, vascular, and nervous diseases, tetanus and typhoid and tuberculosis are the leading killers. There is nothing we can do to prevent death, since tetanus is so hard to kill, and the others breed so rapidly in any case, and so much more rapidly now, that we are completely powerless.

"We can't give antitoxins, because we don't know whether the person has the disease, or what disease he has. And in an hour or so, it's too late. All we can do is watch them die by the thousands and wonder who'll be next."

Ross kept his eyes down, staring at the floor. Horror was etched on the three faces.

"How is the vitality of the people?" Ross asked, at last.

Rand shook his head slowly. "Very low. They sink as rapidly as old people. If we didn't know their ages, we'd call it senility."

"It is," Ross said hollowly. He outlined his heavy-water theory.

There was silence for several minutes.

"What can be done about it?" Rand asked.

"There should be several other isotopes of water, though heavy water would naturally predominate, since the action of electrolysis is to break down water in its component parts, thereby adding electrons to a tiny part of the entire amount of water. That's heavy water; water with a greater valence than ordinary *aqua pura*."

Rand shifted anxiously in his uncomfortable straight-backed chair. "What would the action of other isotopes of water be?"

"Frankly, I don't know. It's my opinion that there should be an isotope that would reverse the metabolic rate, and, instead of aging, make the cells and muscles grow younger. Perhaps it is insane. I don't know. I do know that it's our only chance. There's no other antidote for senility. The chemical action of heavy water in conjunction with increased metabolism is totally unknown."

XIV.

THE DOOR opened. With a sudden drone, whine, and splash of dynamos and tanks, the terrible spell of the small room was broken by the incessant scientific activity going on in the huge loft. A giant of a man, muscled with great cables straining beneath his hairy skin, entered.

"We're ready for you, doc!" he bellowed above the scream of the machines. "We have six ounces of heavy water collected from the tanks."

"Good!" Ross smiled for the first time.

Seeing his cheer, Naughton brightened also and teetered after him a little more quickly.

They stood before a laboratory table, looking at a large graduate filled with a colorless liquid.

"Shut off the machines and tanks," Ross commanded.

The noise died down gradually, the high shrieks and whines of the dynamos lowering by degrees until there was silence—deafening silence that oppressed, bore down on the outraged eardrums.

"This," said Ross, motioning to the graduate, "is six ounces of heavy water—the residue after electrolysis of water. Let us assume that heavy water is a mixture of two—or any number of—isotopes. In the first place, the mixed substances have different physical properties, depending on the atomic weights of the isotopes. Each will boil at different temperatures and go off as steam. By merely using a condensation apparatus, this can be collected.

"Then you can go the other way and

freeze the liquid. One will become solid at a higher temperature than the other The only trouble is, there's no control over the freezing temperature that's safe.

"However, with an electrical heater, we can keep the liquid at a given temperature for any length of time."

He led the way toward a large, brightly gleaming pot, surrounded at the bottom and lower sides with turns of thick, white, crusted wire. The upper part was collapsible, much as a gasworks reservoir; when lowered, the twisting, spiral pipes of the condensing soils lowered also and, with them, the cooling machine.

Gathered around in an orderly crowd, the men watched Ross pour an ounce of the fluid into the thermo-furnace and regulate the gauge for 98 degrees, centigrade. He felt the cooling pipes, surrounding the condensation coils. They were cold enough

Their eyes were fastened hypnotically on the mouth of the distilling coil. A drop, microscopically small at first, then slowly gathering in size, formed on the copper lip Two minutes passed. Ross increased the heat a full degree. Nothing happened. With minute pressure he advanced a few notches, until the thermostat read 99.12 degrees; 88 of a degree below the boiling point of water.

The drop fell, a tinkling splash.

They breathed easily once more and watched the more rapid formation of another drop. Relentlessly, the clock ticked off metabolic weeks for those foolish enough to drink of the city's water supply; the same clock moved with the infinite patience that belongs to eternity.

Another drop fell, meeting the first on the bottom of the absurdly large beaker, and they formed a pathetically small puddle, lost on the plain of the rude beaker, constructed to contain coarser, less rare waters.

Now they gathered and fell with increasing regularity—forty-nine drops of gleaming water—precious fluid holding in its colorless, minute depths perhaps the salvation of millions from premature death, or the antidote against incurable senility that would result, despite cessation of the heavy-water content of the drinking supply.

They waited patiently while minutes went by. No fiftieth drop swelled the tiny amount of light water. Ross opened the circuit, and the thermometer dropped swiftly.

Tremblingly, he filled two eye-droppers, one with heavy, the other with light, water. One drop of each he mixed with five centimeters of pure drinking water. The heavy water he placed before a rat, desperately thirsty. It lapped up the small quantity and searched for more.

Not long after, it attacked the cheese and bread in its cage, devouring great amounts with savage ferocity. Now Ross placed before it the second dish of water. As it ran toward the dish, it stumbled and grew rigid, its eyes glazing visibly, and the muscles growing alarmingly cataleptic. Ross pushed the dish closer.

The red tongue feebly lapped at the cool liquid. Almost, the swollen, glutted body seemed to shrink before their eyes —to wrinkle and age.

And now the water was gone.

For a long while the rat lay there, panting with fear, unable to move its rigid, age-stiffened body. Then, slowly —so slowly did it attempt to stand that the men's muscles were tensed with sympathetic effort—it raised itself upon its trembling legs and leaned heavily against the wire of the cage.

It slept for three days, and when it awoke, it was younger than when the experiment had begun; but that was observed only cursorily, for more important business was at hand. The population had to be saved.

XV.

There was the matter of supply to be settled. When Ross tested the light water on Naughton, at the financier's demand, and the result proved the reliability of the new substance, Naughton insisted on footing all the bills for its production.

The old man drank his ration of light water and slept for a full twenty-four hours; after which he awoke ten years younger. Two drops more caused no added sleep, yet the years dropped from his bent shoulders miraculously. Within two days he felt and looked no more than thirty-five years old.

"How much light water do you need?" he asked Ross at the laboratory.

It was on the 6th of October; the content of heavy water in the drinking supply of New York City had stopped more than a week before—exactly how long before, no one knows. Rapid encroaching senility had now ceased. The population, already aged decades within the period of six short weeks, grew still older at a more normal rate.

"I'll need 1,272 ounces," Ross answered gravely, after scratching on a pad with his favorite soft pencil. "That means 12,720 ounces of heavy water, since the light water is in the ratio of one to ten parts. That will provide each person in the city with three drops—enough to decrease metabolism to a bit below the point it was at when this curse began."

Naughton started. "You gave me three drops, and it took more than twenty years off," he pointed out.

"Certainly! But you didn't drink much heavy water. Now those 12,720 ounces of heavy water, which will provide 1,272 ounces of light water, will be the result of the electrolysis of 12,720,000 gallons of ordinary drinking water. We'll have to bring that estimate closer to the 15,000,000-gallon mark, to avoid any mishaps.

"We're equipped to handle ten thousand gallons a day. With proper equipment we could do more, but not on short notice. It would take us thirty-four years to turn out the 12,720 ounces of heavy water."

Naughton scratched his unruly thatch of jet-black hair and paced up and down the small room. No drone of machinery came through the steel door; the dynamos and tanks were quiet, awaiting orders.

"I could buy up all the electrolytic plants in the country," he suggested.

"There aren't many. If you could buy up three or four, you'd be set to turn out a million gallons a day or more. I don't know the exact amount of oxygen and hydrogen produced, so I can't tell you the output. But three or four plants would do."

"Call up my office," Naughton ordered.

Ross picked up the telephone and dialed the office number.

"Tell my secretary to find out the names of the companies and what they'll take for their plants," Naughton added.

Ross had just spoken to the secretary when Naughton ripped the phone out of his hand and shouted "Never mind!" into the transmiter. He wheeled suddenly toward Ross.

"I just remembered I have a plant near Ashokan Dam that can turn out—let me see——" He snapped his fingers impatiently. "I don't recall how much it could handle. Have to get in touch with Hannon and Finch."

Naughton dialed the office number. "Find out where Hannon and Finch are and get them for me. I'll wait here. Call back in ten minutes."

He strained against the leash of delay. Accustomed to quick action, impotent waiting irritated him beyond endurance. Twice within the ten minutes he called back, shouting angrily at the secretary to hurry.

The bell jangled. Naughton seized

the receiver, tearing it off its hook. "What?" he roared. "What's that? . . . Dead, you say? Why, that's impossible! Don't be a fool . . . I saw them only last week. . . . Oh, forget it!"

"They're dead?" Ross asked.

"Yes, damn them! And I don't know where the place was or how many gallons of water it could electrolyze."

He strode up and down again. Suddenly he grabbed the phone and dialed another number. "Hello! Jackson Heights Airport? I want to charter a plane immediately. . . . What's that?" He slammed down the receiver.

"There isn't a man fit to handle a plane at the airport, the fellow said. Their best pilots are either cracked up or else retired; and the others can't be trusted yet."

"Try the Newark Airport," Ross said. "They haven't been touched."

IN TWO HOURS the men were darting over the Catskills toward upper New York State. The green forest swam quickly below them, dropping swiftly to the rear. Yet Naughton was impatient at the apparent slow airplane, which could do three hundred miles an hour at cruising speed. The pilot had the motor advanced to the limit. They were flying at better than four hundred miles an hour.

A vast lake showed beneath them, half an hour later. Tall trees surrounded the shimmering water in an impenetrable carpet.

"Slow up and circle around as low as you can," Naughton ordered.

They hovered slowly over the trees at three hundred feet. In an unbroken procession the trees marched below them. No clearing showed itself for an hour and a half.

"Fly higher!"

They rose gently. The forest dropped below. Immediately a clearing, containing a huge building, showed three miles away. The pilot gave the ship the gun. They dashed at full speed toward the place.

Ross walked dumfoundedly between the rows of tanks. Such marvelous equipment, far from civilization, was astounding. "Fifty tanks," he muttered, seemingly to himself, though Naughton, pacing proudly beside him, heard distinctly. "Fifty tanks, capacity ten thousand a day, I should guess. Five hundred thousand gallons a day! Twenty days would give us all the light water we need!"

XVI.

THREE WEEKS later ninety-nine gallons of heavy water had been collected from the tanks of the Ashokan Dam plant. In the distilling pots, the record quantity of heavy water boiled into steam at a temperature of 99.12 degrees centigrade, constant; for the lighter water was more volatile than pure water and boiled at a lower temperature.

"Now what do we do with it?" Naughton asked, nodding toward the drip collecters filled to the brims with a total of 98 gallons of light water. "How're we going to distribute it?"

"I don't know."

"Well, how about putting it into the water supply?"

"Wouldn't work. Or, at least, not so well. If we wanted to do that we'd need about ten times the amount of light water we have now, because the action isn't as powerful as heavy water's. Besides, the three minims of light water should be given as a larger ratio than it could possibly be if we simply poured it into the reservoir."

Naughton looked stunned. "But you gave me only three drops, and it made me younger," he objected. "I was pretty much of a wreck."

"Yes," Ross agreed, "but it wasn't so much from the action of heavy water as from the breaking up of your living

routine and starving yourself after devouring such tremendous meals just before. Destruction is always easier in nature than construction; and attempting to rebuild the people's vitality is harder than to break it down."

"Then what are you going to do?"

"You wouldn't want to buy up the milk companies, would you?"

Naughton bit off the end of a cigar and lighted it before answering: "The price is too steep. I couldn't afford it. It runs into the hundreds of millions."

"Then we come back to the idea I had before," Ross said. "We'll open several light-water stations, giving the water away for nothing."

THUS HUNDREDS of small stores, covering every district in New York City, were opened, stocked with shelves of pint bottles containing a colorless, uninviting fluid. It was accomplished within twenty-four hours of Ross' decision On the same day every metropolitan paper carried a full-page advertisement, calmly advising the people to drink light water, which would be given free to any one asking for it at any of the several hundred light-water stations spread throughout the city.

Naughton and Ross clerked alone in the Light Water Station No 1, on Seventh Avenue, opposite Pennsylvania Station In the morning they unobtrusively opened the store, which previously had been a bookstall, and waited patiently for business.

At two o'clock in the afternoon, Naughton was furiously angry Though several hundred pepole had peered in through the windows, nobody had entered He clenched his great fists, and his powerful shoulders hunched dangerously.

He strode out into the street Ross stared in amazement as the burly Naughton accosted the first man he met. Through the window he could see the financier, his brows lowered, a black scowl on his massive mace, addressing himself none too gently to the bewildered man.

Seeing the possibilty of a fight, a crowd had gathered around. Ross elbowed through. He heard an angry voice and a slightly amused though bewildered voice.

"I want you to come with me!" Naughton bellowed furiously.

"And I say I won't," the other insisted.

"You're going to drink my light water."

The other chuckled. "That's the only kind I drink," he said.

A roar of laughter confused Naughton more than ever.

"That's a lie!" he shouted. "You've been drinking heavy water."

"What of it? Suppose I like it—is it any of your business?"

The man warded off three deadly blows just in time. No weakling himself, he was no match for the brawny financier. Naughton raised an uppercut from the pavement and delivered it with his full weight. There were two sharp cracks—one as the lethal punch landed and the other as the victim fell.

Naughton was preparing to drag his conquered enemy into his lair and feed him light water when a policeman stepped up and laid the hand of the law on his muscular arm

That night, just after midnight of the 8th of October, Naughton was disturbed while undressing by the ringing of his doorbell. A long discussion followed—hampered by the presence of his probation guard—that ended in mutual discouragement. Ross had left twenty minutes before. Naughton threw on a bath robe and hurried down the stairs, thinking Ross had returned with an idea. He met the butler, clad in flapping nightshirt, laboriously climbing the stairs toward Naughton's room.

"Some drunkard, sir," the butler panted. "Spoke some nonsense about putting your light water across I sent him quickly on his way, you can wager."

"You fool!" Naughton stormed. "Who was he? Run down and get him!"

SHIVERING, the butler dashed out into the cold night air and ran down the street, his ghostly nightgown clinging to his skinny shanks. At the corner he found his quarry whistling after every car.

"The master wants you!" he cried hoarsely.

"You'll catch a cold out here."

The weaving fellow at the butler's side was annoyingly solicitous and offered him his flask. Wabbling on his cold, numbed legs, the butler was also forced to push away the flask at each step

"What's your name and what do you mean by waking me up at this time of the night?" Naughton demanded, not too angrily.

"Name's Pete Sloane, and I didn't wake you up. Saw your light and I remembered you needed me, so I dropped in. Have a drink?" He waved the flask.

Naughton shook his head impatiently. "What can you do for me?"

"Put your light water across with a bang!"

Sloane formed a pistol of his thumb and forefinger and aimed at the officer who was clambering downstairs. The guard reached for his revolver. Sloane was unembarrassed.

"You have an idea it's good for the public and they ought to drink it, hah? Well, you can't give it away; you gotta charge. I'll handle publicity."

"How would you handle it?" Naughton was interested; he leaned forward tensely, his elbows pressed on his thighs.

Sloane waved his hand disparagingly. "Easiest thing in the world. You said in your advertisement that the stuff was colorless, odorless, and tasteless—just like pure water People suspect a gag when they see something like that—sort of think you're trying to put something over on them, like handing out free water. You can't do that, you know.

"Now here's what you do." Sloane enumerated his points on his fingers, drunkenly bending them back until they almost broke "Make this light water into a sickeningly sweet sirup, label it anything you want, and charge for it. I'll take care of the advertising."

Naughton stood up haughtily "You have the wrong idea. I'm not going into the patent-medicine business I don't want to sell the public any light water. I want to give it away."

Sloane saw his dismissal; he blubbered "Give me a chance. I'm a sports editor, and I don't want to be a sports editor. You've never been one, so you don't know what I have to put up with."

Naughton grinned.

"All right!" Sloane jumped up beside him and grasped his arm. "Put this stuff up in fancy bottles, with pretty labels on them. By the way, how much of this stuff do you have to take?"

"Three drops."

Sloane hauled out his flask and looked at it disgustedly "Three drops! Must be powerful stuff."

"We can put it up in pint bottles. Six doses should be enough," Naughton hastened to explain.

"But that would kill them!" Sloane was horrified.

The probation officer dragged at his revolver.

Naughton laughed heartily. "In solution. Let's hear the idea."

HISTORY rushed its course madly, aided by Naughton's great wealth. Candy firms threw aside all other busi-

ness and, employing the light-water mixture, prepared enormous vats of simple sirup, sufficient to fill forty-two million pint bottles.

On the 10th of November the public woke in the morning to find a quantity of fashionably designed bottles standing beside the milk. There were as many bottles as there were persons in the family. The instructions attached read, in essence, the same as the two-page spreads in the papers that morning, afternoon, and evening:

"Helthglo Anabolic Laboratories offer you, free of charge, a sample of its marvelous preparation, designed to reverse the process of metabolism," the advertisement screamed in scarehead type. "We guarantee to take five years off your appearance and actual rate of metabolism with each bottle of Helthglo Anabolic Fluid. This preparation is indorsed by leading physicians."

Doctors, indignantly perusing the phenomenal advertisement, prepared to berate the newspapers for permitting such quakery to be advertised, until they came upon the photographs and indorsements of the Board of Health smilingly facing them. They retrieved their bottles from the garbage cans.

A CITY-WIDE holiday was observed, though called by nobody in particular, since no one was awake to call it. The people slept through a full twenty-four hours and woke five years younger.

The amazing restoration of youth proceeded for six days, until the supply was exhausted New York, once again a city of youth, with nobody older than forty, led the world in liberality of politics and business. Early in November plans were announced for new public works.

Naughton and Ross averaged each day a hundred thousand rejected orders for Helthglo Anabolic Fluid for a full year.

Impressions

I have just read seventy-three letters which have come from readers during the last week. They leave me with many undigested impressions. Usually I wait a few days for the ideas to "jell" before attempting to answer, but this time I'm answering at once, hit or miss. The strongest impressions stick in my mind asking for comment.

Stanley Weinbaum seems to be in demand at the moment! I agree his first stories are fine. There is one in this issue. Requests come for Eando Binder. I'm glad to report that Binder has reached our rather strict standard and is scheduled for the May issue. John Taine also comes back to science fiction in our May issue, beginning a great serial, "Twelve Eighty-Seven." He is the last of a great group to reappear in science fiction. Also, one by one we have found new authors.

"Alas, All Thinking" by Harry Bates was crowded out this month. Our former editor has done a great job on this novelette and deserves a real hand from the readers when his story appears next month. Watch for it.

I just bought "Earth's Mausoleum" from another old favorite, John Russell Fearn. It's quite the best piece of work he's done in some time. Half a dozen requests for him are in this week's letters, too.

Van Campen certainly has set blood to boiling. They're either for him or agin' him, and how! Sorry there isn't room for all the letters attacking or defending him in Brass Tacks. Sorry I can't make cuts of all the formulas in the letters.

And so it goes. Seventy-three letters this week! Some criticism but mostly praise for the progress of the last year and a half.

And time passes. An hour and the lines form; the vision sets, the future is good. I'm listening, planning, driving. This pause for your impressions simply makes the drive more keen. There are great things in store this month, next month, the month after. We aren't letting up. The pace has been set; it must be held. I believe we head the parade. We intend to stay in the lead. There are new thoughts in science fiction, new pathways to explore. We've found some. As the months pass we find new ones opening.

Last month I said we were accelerating. I believe this issue proves it.

Next month? I'm mighty enthusiastic about our schedule.

Are you introducing the magazine to your friends? That's part of the program, you know. For our reading circle is different from that of other magazines. With us it's "all for one—and one for all."

——The Editor.

Paging Mr. van Campen!

Dear Editor

Mr van Campen, leader of the Revolt of the Chemists has again evaded the clutches of our loyal "Astounding Stories" physicists, but I have resolved that this villainous plot against Universal law and order shall be nipped in the bud before one erg of illicit energy is bootlegged into the pages of our fair magazine. For Mr van Campen has left one unattached loophole in his arguments, he has forgotten to take into account the energy given to the ejected gases which the rocket reacts against, and this energy, as I shall attempt to show, is just sufficient to account for the hitherto unaccountable gain by the ship.

This can be proved quite simply by algebra. We will first of all, suppose, in order to reduce our example to cases which have been proved on Earth, that a blank gun explodes. The gases will gain velocity relative to Earth in one direction, the gun in the other direction, and assuming no friction, the energy put into the gun is MV^2 where M is the mass of the gun, V the velocity relative to the Earth gained by the gun. The energy put into the gases will likewise be Mv^2 where M is the mass of the gases, V the velocity they gain relative to Earth. Therefore the sum of the energies put into the gun and the gases is mv^2+MV^2 with velocities relative to Earth. If the gun is an airplane or a space ship moving with uniform velocity relative to Earth, this law will still hold, if velocities are measured relative to airplane or space ships. Now if we let v and V represent changes in *velocity* relative to Earth or any other body unaffected by the explosion, it is obvious the above formulas would still hold, if that other body moved at a uniform velocity with the gun and gases before the explosion.

With the preceding paragraph in mind, if we can show that the energy put into the ship and ejected gases is equal to the sum of the gains and losses of energy by the rocket and the gases, the law of conservation of energy will have been proved to hold for a rocket. Therefore, let m = the mass of any space ship whatever, M = the mass of all the gases ejected from a rocket during any single explosion; v = the velocity gained by the space ship as a result of the explosion, V = the velocity gained by the ejected gases. For the present we will suppose that the explosion occurs instantaneously so that the ejected gases act practically as a single mass. As a final assumption, let S = the original velocity of the ship and the gases before the explosion. (All velocities are measured relative to Earth or some other body unaffected by the explosion.)

Referring to the formula energy equals mass = x velocity^2, the total energy given to the ship and the gases together is mv^2+MV^2, while the original energy possessed by the ship and the gases before the explosion was $(M+m)s^2$. The velocity of the ship after explosion is s+v. Note, since the gases and the ship are impelled in opposite directions, if v is +, V is —, or v is —, V is +, that is v and V are always opposite in sign. The energy of the ship is $m(s+v)^2=ms^2+2msv+mv^2$. The energy of the gases is $M(S+V)^2=Ms^2+2MsV+MV^2$. Sum of the two energies is $ms^2+Ms^2+2msv+2MsV+MV^2+mv^2=(m+M)s^2+(2s(+MV+mv)+MV^2+mv^2$. Referring to $2s(+MV+mv)$ $MV=mv$, for the momenta of two objects are equal, if the same force operate on both for the same time. (Newton's laws of motion.) Since the sign of MV and mv are always opposite their sums equal zero, and consequently

Hence the total energy of the ship and gases with reference to the Earth is $(M+m)s^2+MV^2+mv^2$. $(M+m)s^2$ was originally in the ship and gases. MV^2+mv^2 is what we put in, and it is also the total gain as measured with respect to any unaffected reference body whatever. Therefore no energy is lost or gained, and the law of Conservation of energy is proved to hold for this case.

Referring back to the beginning of my argument, I assumed the explosion was so rapid that the escaping gases acted practically as a single mass. But even if they burned very slowly, the explosion cannot proceed in stages smaller than a single molecule, so the law still holds.

Well, best wishes to Mr van Campen and to Astounding Stories. If he can squirm out of these objections, he is a better lawyer than a physicist. As you will notice I have made no reference to absolute space or ether as others have done, and I have disregarded the effects of gravitation for convenience and brevity.—**David Bohm, Wilkes-Barre, Pennsylvania.**

P. S For clarity, I have decided to interpret the forgoing algebraic proof with less abstract reasoning It is true, as Mr van Campen says, that a rocket maintains constant acceleration with constant fuel consumption, but its mass must contannally decrease as common sense would show by continually ejecting burned out fuel This decreasing mass would result in lower values for the available energy of the ship than Mr. van Campen's calculations lead one to expect Next we must not forget the fuel is burned to raise reserved fuel to the required velocity (which I have called s in my calculations) before it explodes and is ejected from the rocket tubes Aud during the explosion the ejected gases take still more energy from the fuel With all this energy put into the ejected gases, none is available from the ship, in fact, after the explosion, the ejected gases possess less energy relative to Earth than before the explosion but their velocity relative to Earth is lowered Now what I have proved by algebra is that if we take all the energy we put into the burned-out fuel and the ship, it will in all possible cases just equal the resultant gain of energies of the ship and of the gases, these energies measured relative to any reference body, be it Earth, Jupiter, Orias or what have you. And if Mr van Campeo will revise his calculations so as to include momentum action, reaction, and other factors which he so conveniently disregarded, he will find his energy equations balance exactly

For the Good Old Days?

Dear Editor.

I am writing this letter to voice my approval of the letters of Joseph Hatch and Ed Camille.

I certainly agree with Mr. Camille that science-fiction has reached the point of collapse. I have been a reader of science-fiction since 1928, and believe me, it is hard to compare the present day science fiction with that of "the good old days" In the last seven issues only *The Skylark Of Valeron* could compare with any of the old classics, nor do I consider this story equal to the first two Skylark stories

Mr Camille is right Instead of publishing Astounding Stories twice a month, give us another magazine of the old "blood-and-thunder" stories. I am sure there are many science-fiction fans who believe as I do, and would welcome a return to this type of story.

I also agree with Isaac Asimov, of Brooklyn, N Y, that interplanetary stories are few and far between. In the early days of science-fiction the editors of all three science-fiction magazines declared this type of story to be the favorite of the majority of readers Surely they haven't changed

I am not writing this letter as a brickbat, but merely as a plea for the old type story Why not let the readers vote on this question?—Jack Wilson, Big Spring, Texas

Fort Died in 1932.

Dear Editor:

Speaking of last month's issue, well what there was of it I beg you to put out two issues a month They would go over big As for all this controversy over *Lo!* the article wasn't worth any of it If Fort knows so much why is it we never hear about him elsewhere?

This guy Allcock who has a letter in January's Brass Tacks, sure can write How is it such a sensible fellow can be misled about Lof As for all these letters about staples, it took me five minutes to find them, so keep on going twice a month with magazines such as you're now issuing once, and you'll get forty cents a mooth from me at least

Mr Carswell of northern Ireland says that he would like to get into touch with an American boy fourteen or fifteen years old Well, I'm fourtren, and if Mr Carswell or any one else wants to write, I'll answer faithfully — Robert Brennan, 82 Wilcox Avenue, Pawtucket, Rhode Island.

Moore & Graham

Dear Editor:

After reading the three principal science-fiction magazines for over three years, my congratulations go to you, editor Astounding Stories is, in my opinion, the best in the field I enjoyed every story in the February issue And now how about putting C L. Moore and H W Graham to work? And if I may offer a suggestion, your magazine would be appreciated much more by readers if the edges were even —T Gelbert, 3035 Niagara Street, Niagara Falls, New York

Binder is on the Schedule.

Dear Editor:

This letter is not very long, so I hope to see it in Brass Tacks I have just finished with the February issue The best story in it was *Parasite Planet*, by Stanley G Weinbaum Mr Weinbaum's stories are full of interesting features, and he writes in such a realistic manner that I take much pleasure in rereading them. I like the way he describes all the strange plants and animals of his yarns He gives the reader a clear picture of the surroundings in which his adventurers find themselves All his stories are so logical that they actually seem true. It gives the reader the impression that such things could be When this can be said about an author, it means that he is good—perfect, in fact!

In my opinion, Mr Weinbaum and Mr. Eando Binder are the two best writers of science-fiction Their stories are always logical, attention holding, and true-to-life What more need be said?

I would like to see Eando Binder added to Astounding's growing list of fine authors — Charles Pizzano, 11 Winthrop Street, Dedham, Massachusetts

Timing in on Work!

Dear Editor

I have followed with interest the controversy concerning the Conservation of Energy precipitated by "The Irrelevant" I have decided to load my disintegrator with brass tacks and—bang! Here I am, I hope

Here is the layout as I see it We have four factors, First, the Law of Conservation of Energy which states that "energy cannot be created or destroyed, but that all forms of energy are mutually interconvertible" Second, the footpound unit of mechanical energy which is defined as "the amount of work done by a force of one pound acting through a space of one foot" Third, the theory of acceleration, which is well known to Astounding Stories readers, and is based on Newton's Law of Conservation Fourth, Mr van Campen's argument, which indicates that a space ship, acting according to the acceleration theory, would perform as amount of work as measured in footpounds, which would be entirely out of proportion to the amount of energy applied to the propulsion mechanism, therefore disproving the Law of Conservation

It is easy to see that at least one of the four factors is incorrect as applied to the problem, since they bring up a contradiction I think that all of us space travelers agree that the acceleration theory is O K, as that leaves just three factors. One side says that Mr van

Campea is all wet The other side doubts the Law of Conservation Except for Mr J P. McCormack who is not crazy and who says that the problem "involves only the definition of work," neither side questions the definition of the footpound' Why not? Definitions are very often inaccurate The physicists are so contemptuous of definitions that they have never devised any for electricity

Of the three factors, it is my opinion that the Law of Conservation is by far the strongest Therefore, I believe that the controversy, if it continues should rearrange itself into two factions, one which shall try to pick a hole in Mr van Campen's logic, and the other to attack the definition of the footpound as a unit of work

Perhaps Mr F G Hehr could formulate a new and better unit of work Hi! Seriously though, I for one, would like to hear the details of his theory of the nature of electricity It sounds logical.

By the way, I'd like to set Mr. Hehr, and possibly others straight on a small but important point Electrons do not race through a conductor at the speed of light It is the electrical impulse which travels at or near the speed of light To illustrate Suppose there are parallel wires 300 000 kilometers long At one end they are connected through a currant meter If you should connect the other pair of ends to a battery, the meter will register approximately one second later But it may take hours for electrons leaving the negative terminal of the battery to reach the meter through one wire and the same length of time for the return trip through the other wire The electrons which first activated the meter were idle electrons already at the meter end of the line which were set into motion by the electro-static force which traveled at the speed of light through the line —O M Davidson, Jr., P. O Box 24, Ged, Louisiana

Meet T. Olog!

Dear Editor

You take the cake! Of all the wild weat, thread bare yarns, you get them Your writers have something you call style And somebody suggested a fairbrain adventure magazine' At least you could have something interesting in them, as had Anthony Gilmore,

Your only Four Star writer is Jack Williamson John W Campbell Jr, and E E Smith both peddle the same gooda and it smells of ye good old hash to me Over all things—in the name of good entertainment—have your characters "real' Your "style' specialists have characters who speak in half whispers, are keyed up heroically, and plots that stink from as far back as 1927 I like them anyhow, being a stf hound

Cut out the serials complete if they've no real entertaining 'story' Incidentally I'm for twice monthly appearance —T Olog, San Bernardino, California

Rates and percentages!

Dear Editor:

I have long contemplated on which of the three science fiction magazines I hold highest in my own opinion One was easily discarded. Astounding Stories rated 99 88/100% perfect and the other 99 99/100% perfect If I hadn't neglected to read Raymond Z Gallun's colossal story *Old Faithful*, thus bringing Astounding Stories up to 100% Astounding Stories has always been the leader in the actual reading material in both quantity and quality The illustrations reproduce better and the printing is good But the other magazine has more to think about and it has the "League"

I would appoint the following authors honorary blue ribbon prize winners or what have you? I consider the stories below masterpieces in science-fiction.

Raymond Z Gallun's—*Wunds of Creation* and *Old Faithful*,
Leo Zagat's—*Spoor of the Bat*,
Frank V Kelly's—*Crater 17, Near Tycho*,
Karl van Campen's—*Irrelevant*
Jack Williamson's—*Born of the Sun* and *The Legion of Space*,
Nat Schachner's—*He From Procyon*,
David O Woodbury's—*Aground in Space*,
Howard W Graham, Ph D's—*Guns of Eternal Day*

I have the ego to hope that I have the average amount of intelligence, little or no scientific knowledge, and a fertile imagination *Irrelevant* appears to be the most plausible theory on space travel But although it is in my opinion nitro scientific, it detracts none from the actual story and plot —Wloston Harwood, 320 East Harrison Street, Harlingen, Texas

The Paper Is All Alike!

Dear Editor

I have never before written to any of the science-fiction magazines, though I have either subscribed or purchased on the news stands all issues of every science-fiction magazine ever published

This, my first letter, is written to tell you that without a doubt Astounding Stories is the very best magazine of its kind published I should be very sorry to see it disappear and would welcome an issue every fortnight or even every week

If it would help to subscribe I will be very glad to do so, but my experience is that the subscribers are forgotten people as they generally have to wait till the news stands get their copies It seems to me that preference should be given to those who pay in advance.

I am over forty years old and that is why probably that I prefer stories of science-fiction with the science soft peddled somewhat, long discussions of why and wherefore of atomic and chemical reactions do not belong in real literature, especially in the science of the future where no one can truthfully say they know the real trend

The great masters of science-fiction have suggested rather than delineated the scientific aspects of their plots and still their stories are read and enjoyed

"Astounding' stories have more of the characteristics of the stories of the masters than those of other magazines on the whole Most certainly I would not lose an issue of the other magazines as good stories are found in them also but *Astounding is outstanding*, in all respects—there is a slogan

If there are among your readers, either men or women, of like interests and of mature age, who would care to correspond with me I should be interested in hearing from them Long life to Astounding Stories

Is it possible for the subscriber, by paying more than the regular price to secure his magazine printed on a grade of paper superior to the regular pulp paper' If so how much?—E W Baxter, P O Box 53, Woburn, Massachusetts.

John Taine and Eando Binder are scheduled,

Dear Editor

Yes Astounding has come a long ways in the past year. You have only to place copies of the February 1934 and February 1935 issues side by side to see that Better stories better illustrations and a bigger magazine

I liked the end of *The Skylark of Valeron*. *The Mightiest Machine* is increasing with interest Schachner, Welnbaum Buchanan and Carr Stuart and the others finish off what is one of the best issues you have yet printed. The illustrations are superb

Would like to see the story title lettering like that used in the ad for *Proxima Centauri* on page 82 of the February issue

More new names for the new *Astounding*: John Taine, Eando Binder, P. Schyler Miller, Edmond Hamilton, A. Merritt, and Otis A. Kline.—Jack Darrow, 4224 North Sawyer Avenue, Chicago, Illinois

Mr. van Campen—On Guard!

Dear Editor.

About Mr. van Campen's story. I little wonder that physicists hem and haw when faced with the situation presented in his story. The reason? Because the story is utterly without meaning. It is well named, "The Irrelevant." The sentences are not relevant to one another in grandiloquent fashion and with an utter disregard for their meaning. Mr. van Campen talks glibly about force, work, acceleration and energy. Here's one absurd conclusion that may be drawn from the story. This is the situation as he presented it:

Using a time unit of one second:

Case 1. a=10 ft
f=1000 lbs.
w=fs=10000 ft. lbs.

Case 2. a=52,800 ft.
f=1000 lbs.
w=fs=5,280,000 ft. lbs.

Swell! Then according to Mr. van Campen, the amount of work done by the oxidation of the fuel is a variable dependent upon the velocity of the ship at the time of burning. Such a statement is nonsensical. The energy (work) produced in any exothermic chemical reaction is in no way dependent on the velocity at which the mass of fuel is moving, but depends upon the mass of fuel present and its energy of combustion per unit mass.

Looking at it from another angle, might I inquire just how the ship attained the velocity it has in the second case? Perhaps this will help clear up the situation. The work done in the second case is, I will admit, as stated above, *but* it is a result of the velocity 10 miles per sec. imparted to it by the action of a force at some previous time. The work done due to the imposition of the 1000 lb. force while traveling at this velocity will be $\frac{1}{2}m(\Delta v)^2$, where Δv is the change in velocity caused by the imposition of the force.

About the question of relative velocities. Let us say that Barret's ship is travelling at a velocity of 50 mps. with respect to a distant nebula and that it has gained a velocity of 10 mps. with respect to the earth. This means that the earth is travelling with a velocity of 40 mps. with respect to the nebula, and therefore the principal part of the energy possessed by the ship is *not* due to the fuel, but is due to the velocity imparted to the ship by the earth by virtue of its velocity with respect to the nebula. The law of the conservation of energy is not violated then.

(Sorry the formulas must be omitted—Ed.)

What Mr. van Campen seems to have done is to have used two coordinate systems of reference moving with a relative velocity of 40 mps., which is a rather serious error. I'm sure that Mr. Einstein would be the first to admit that our physical laws cease to have significance when we do this.

I would also like to say a few words regarding the "physicists funny ideas about atoms" that Mr. van Campen mentions in his December letter in A. S. I would like to point out that the chemist's atom is an ignominious failure when it comes to explaining the phenomena of radiation and spectra. At least the Rutherford-Bohr atom does this. But both have their advantages, so let's not quarrel over this point.

If anything in this letter offends Mr. van Campen he has my humblest apologies. I am only interested in reaching a satisfactory conclusion. And it is for this reason also, that I sincerely hope that this letter is published.

The February issue was tops.—William H. Pell, Box 2201, University of Kentucky, Lexington, Kentucky.

And Another!

Editor Brass Tacks also Mr. Karl van Campen:

The discussions in this month's Astounding re the *Irrelevant* have afforded me considerable amusement, so I'm going to take my turn at trying to knock down the "straw man." Now I'm neither physicist, chemist, nor any other "ist" and maybe you'll be able to turn the laugh on me, but I'll take the chance—it may afford you a little recreation, and I believe I can turn some light on the snubject, as it appears some one has overlooked a basic idea.

First—there is this question of "pushing against its discharged gases" (?). If so, how did it get started if out in space with no "discharged gases to 'push' on"? According to my information, a rocket moves on much the same principle that dynamite acts upon, the idea being that gas is produced from a solid (or liquid) and the effect is in proportion to the rate of gas production. In other words, if a quantity of dynamite be laid upon a rock and burned (Yes, it's been known to *burn* sometimes) the rock suffers no *apparent* effect, the gases escaping slowly into the atmosphere, but if an equal quantity of dynamite is *exploded* upon the same rock then a definite effect is produced, depending upon quantity, type and size of rock, etc., but most certainly producing a definite downward thrust upon the rock. Therefore, the "rocket effect" is produced by the inertia of the rocket as compared to the gas expansion.

If then, a rocket in motion in space were traveling at such a rate as would equal the rate of expansion or production of gases driving it, then it would appear that no effect (acceleration) would be produced, the rocket moving away from the production point so fast that the gases would be *free* to expand without encountering the rocket. Of course, the *source* of production is *within* the rocket and carried with it so outside reference points are unnecessary in our little exposition of the problem, the resulting rule being that the actual work accomplished (acceleration of the rocket) will vary according to the speed of the rocket, *decreasing work* being done *with increasing speed* for the *same amount of fuel* up to the vanishing point where the rocket reaches the speed of the gas production and the well known law of "conservation of energy" is fully vindicated, the entire power produced at such speed being consumed in the production of heat.

Maybe I didn't phrase the above as fortunately as possible but think it over carefully and I feel sure you'll get the idea—that if the speed of the expanding gas is, say, 1,000,000 feet per second (from its point of conversion from liquid to gas) and the speed of the rocket is equal then the rocket will receive no propulsive impulse.

Of course, Astounding is the best of the science magazines and has been ever since the new management took hold—I've about quit buying the others.—favorite author E. E. Smith.—R. R. Spears, Key West, Florida.

Suggestions

Dear Editor:

I have read all the copies of the new Astounding Stories. I enjoy your magazine more than any other one; however, I have some suggestions which I would like to make.

I have long enjoyed the stories of Edgar Rice Burroughs, my favorite author. In fact it was because of my great love for this type of story that I began reading this magazine. I think that there are entirely too many scientific details explaining each new theory. I read your magazine for the story, not the theory.

Every one knows that Burroughs is the outstanding writer of fantastic stories and I feel that if you should pattern your stories more on his style, leaving out details and telling only the story, that his great following would be your great following. Jack Williamson is your outstanding author of this type.

If you wish your magazine to remain as it is, I think it would be a great idea to publish a sister magazine containing stories of the type mentioned above, in which your authors should be allowed to soar to the highest flights of fantasy—minus the complicated explanatory details. I think a magazine of this type would be a success.

Since I have been reading Astounding, my favorite stories have been *Rebirth*, *Colossus*, and its sequel, *Colossus Eternal*, *Born of the Sun*, and *The Legion of Space*.—Charles F. Green, Jr., 1312 Grace Street, Wilmington, North Carolina.

Supporting Van Campen.

Dear Editor:

May I suggest that before a score or so of the would be Einsteins attempt to besmirch the good name of Van Campen, they should at least refer to one physics textbook to check on their own ideas concerning the basic principles of physics. I also suggest that Mr. Ehat should appreciate in physics instead of chemistry, and that M. A. Rotkman should refrain from writing such scathing letters without a knowledge of fundamental, let alone "abstract" physics. My advice to him is to take his high school physics at once! Perhaps he will be "amazed" to find that he can show Einstein a few pointers on relativity. Although I find that a great deal of informative, scientific knowledge is to be had in Astounding Stories it does not attempt to be an entire textbook. Its main function is to entertain and that it does admirably well!

It is possible that the honorable Mr. van Campen has really hit upon something. Remember, some of our important natural laws were, when discovered, contradictory to previous established but fallacious theories.

Van Campen certainly closed his letter with a crack "par excellence." Sorry, Van Campen, but a footpound is one pound lifted one foot. You cannot expect to lift a pound one foot with the same amount of force that you merely moved the pound one foot distance.

I wonder if F. G. Mehr knows what metaphysics is?

Now a hit for the magazine. Science fiction is the best of the pulps (of all fiction as far as I am concerned) and Astounding is the best of the science-fiction by far. The others can just as well fold up. All the more power to Astounding and its editor!—Bernard Ruffel, 2416 Bath Avenue, Ashland, Kentucky.

Sorry we haven't a list.

Dear Editor:

I sure get mad when I hear—or read about—another science fiction mag bragging about how good their stories and how much more reading matter the mag contains, when I know it isn't true. Astounding is the best. By all means it should come out twice a month, or even oftener.

Somebody in Brass Tacks said a copy of Astounding had more reading than any quarterly could have. He must have been crazy, for anybody knows a bigger mag has more pages and more reading. He should want a semi monthly or quarterly if he likes Astounding as well as he says he does.

I think a planetary novel, featuring one certain character every month, would be very good and I don't see why some should object to it. They don't have to buy it. Also a fantastic magazine with stories like Burrough's and Cumming's atom stories would be very good. I like them much better than the type published in the science-fiction mags, and they were the reason I started reading Astounding.

Also I heard that Cummings, Kline's, Merritt's, Farley's, and other old stories could not be reprinted in magazine form. Why not, if possible, print them in the small paper-covered books like the Buffalo Bill stories are in. I am sure they would be bought if put on news stands. And you could put the Skylark Stories in that form, too.

Well I guess that's all, but I sure hope you will do some of the things I mentioned. Yours, till the above happens.—Bill Barclay, 2635 Hazel Street, Beaumont, Texas.

P. S. If you happen to have a list of all the fantastic books—and others, too—in the paper-backed form, would you mind sending it?

Glad to Help.

Editor Brass Tacks:

I have been reading science-fiction off and on for about ten years and have only done so as purely a diversion from ordinary stories of good type. Lately, I seem to have been bitten by the "science fiction bug" and I have been collecting all types of science fiction. I seem to have some trouble getting the types I want and in reading your magazine I see that you have published requests for back issues of science-fiction. Would you be so kind to publish the below list as follows?

Wanted—back issues of the following science-fiction literature, must be in excellent condition, no pages or covers missing, good paper inside.

Amazing Stories—April, 1926, to December, 1927, inclusive.

Astounding Stories—1931 August, 1932: May, July, August, October, December, 1933: February, October, 1934, March, 1935: January, February.

Fantasy Magazine—Volume 1, Number 1 to Volume 4, Number 1, inclusive.

International Observer—Volume 1, Number 1 to Volume 1, Number 3, inclusive.

Science Fiction Series—Number 1 to Number 12, inclusive—little library by Wonder Stories.

Miracle Stories—two issues.

Science Fiction—mimeographed magazine—five issues.

Scoops—English science-fiction magazine—twenty issues.

Amazing Stories Annual "1927" issue.

If you will be so kind as to publish the same in your Brass Tacks column it will help me immensely. By the way, I am sending in a subscription to your magazine and it should arrive shortly.

Thanking you in advance for any assistance you can give me.—George G. Clark, 8709 15th Avenue, Brooklyn, New York.

I liked it, too!

Gentlemen:

It was quite by chance that I picked up and read your January Astounding Stories. The stories were interesting but there was one that impressed me very much, *Flight on Titan*.

Let's have some more of this author's stories. —M. R. Wood, 110 S. 4, Waco, Texas.

Your Comment Helps.

Dear Editor

This is my second letter to your most superlative publication

For quite some time I have noticed that many of your authors delve far into the realm of detail in explaining some of the scientific machines in their stories This may be very interesting for those who are well versed in such matters and understand them I believe, however, that they are utterly devoid of interest for the average reader

An excellent example of the type story that I mean is the serial, *The Skylark of Valeron*, which went into very deep detail This story covered seven issues of the magazine If the uninteresting details had been left out the story could have been related in much less time and in a far more interesting way I think that if this had been done the story would have been looked upon with far more interest than it is at present To me the *Skylark* has been the greatest disappointment of the year

I believe that if you would hold a vote on the above matter you would find most readers agreeing with me

I also believe that your magazine would be benefited by stories written by Burroughs or some other author who leaves out unnecessary detail

In closing, let me say that I think Astounding to be the best magazine on the market.—James W. Perrie, Jr., 1615 Market Street, Wilmington, North Carolina

Of this and that.

Dear Editor

I wish to have a word on the *Irrelevant* question

I allow Van Campen has bringing up the thought of relative forces But when he commences to state that a given quantity of fuel has less energy in a ship at ten miles per second than if the relative speed of the ship to some body were 25,000 miles per second, he is only kidding himself The relative part can be left out entirely The relative energy is interesting only as a statement showing the relative velocities of special bodies

The energy of a pound of fuel is the same, whether at sea level or a thousand miles in space However, there are many factors which would lower the efficiency of that pound of fuel in a rocket Near the earth is air, gravity, perhaps magnetic drag, light pressure, and electric disturbances The fuel in space may actually gain in energy values, but this would be because of the action of outside forces and not because of the fuel itself

It seems quite logical to me that there is a conservation of energy Not that energy has to take forms as we know them, but rather that used energy would be converted into something else If the whole Cosmos were to run down, all the energy that it originally held would be there. Otherwise, where would it go?

Van Campen brings up, indirectly, how little we actually know And the funny part of it is, as he says, that our scientists don't want their little formulae and theories disturbed, even though this disturbing would undoubtedly have a beneficial effect When in a physics class in high school, the instructor told us we had to use formulas presented to us, in spite of the fact that some did not seem to hold water Most of our petty ideas are really very localized No matter how good our present methods of doing things may be, there are better ways, but our scientists seem afraid to really extend their imaginations

When will we have a formula for work, when considering the energy of an outstretched arm holding a weight?

When will scientists confess that they don't know the speed of light?

When will our gravity laws be combined with magnetic?

Why isn't real aid given to help the rocket societies to really do something that will show the actual conditions of space?

Can a scientist tell, and be sure, that a planet must be magnetic in order to have gravitational influence?

Can a planet, or celestial body, have an orderly position about a sun without gravity? Would not magnetic forces do just as well?

These are a few of the things I would like seen answered I think they show some of the irrelevancies of our present system of thought

I see that some are still kicking about Fort At least he made many sit up and think He is most likely wrong on some points, but he does give some interesting data on oddities You can't refute everything he says' If some of you can remember back about seventeen years, you will probably have seen a news picture, on the screen, showing a man coming out of his doorway He has an umbrella which he opens, he walks a few steps and closes the umbrella There is no more rain! Outside of this doorway, for forty days I think it was, rain fell. Just a few feet either side, and there was no rain

If any one thinks that strange things do not occur, he should have read some of the things I have experienced, and these were printed in The Fantasy Fan a fan magazine I wasn't always alone in my observations, either. There is the time when a shadow, covering a large space, was seen No cause for this phenomenon Another case was when three of us saw a beam of light come down out of the clouds a number of times at irregular intervals, while we could not find anything to account for it.—Kenneth E Pritchard, 82 Second Street, Pittsfield, Massachusetts.

He didn't like "Lo!"

Dear Editor.

Have been reading science fiction for about nine years, the new Astounding is so far ahead of any others—past or present—it prompted me to write my first letter to any magazine, will try to be brief

If you trimmed the edges, and charged me a quarter, I'd still buy it—but don't do it, I like the edges "as is," and anyway, I don't read the edges

I don't like serials, and don't read many Exceptions *The Skylark of Valeron*, because I had read *Skylark of Space* and *Skylark Three*, and I skimmed through *Lo* All I can think of is trash simply the hallucinations of the weak minded and religiously superstitious. But Dr E E Smith is still the "Tops," the king of superscience-fiction I believe that any one who says they did not enjoy *Valeron*, simply lacks sufficient imagination to follow him

About the bi-monthly question At first, without thinking, I joyously said "Sure," but analyzing the motive, I found It was a desire to heap compliments on praise, for the way Astounding has scaled the heights in a little over a year, since returning from Valhalla So my second thought is "Stay As Sweet As You Are,' but I would *welcome* a quarterly, with the same standards as Astounding, and NO reprints

I am not reading *Mightiest Machine* One serial is almost too much for me, two are impossible I feel sure it is a fine story, and if it were complete in a quarterly, I wouldn't miss it for anything.

Why argue about *Irrelevant?* The story was priceless, and any one who has studied enough science should know better than to argue about such details, seems to me that the arguments against *Irrelevant* are—shall we say—irrelevant? Van Campen can hold his own, in a story or an argument.

To finish I am not a high school boy, or a junior college kid, I suffered those pangs some

twenty years ago, but I try to keep up to date on physics, electrodes, etc.—Raymond W. Newby, (Transmitter Supervisor), WABC W2XE-W2XX, Wayne, New Jersey.

Tucker, Beware!

Dear Editor:

We, the fans of America, cannot stand idly by and see the dreadful work that venomous and insidious organization headed by this Dictator Tucker. We refuse to sit idly by while our magazines come in us tached together or fas tened with rubber bands or cement. So, for the purpose of combating the dread dictator's work, we have gathered in solemn conclave and or ganized the International and Allied Organizations for the Purpose of Upholding and Maintaining the Use of Metallic Fasteners in Science-fiction Publications of the United States of America, Unlimited. We have elected a board of officers, consisting of Donald A. Wollheim, High Cocolorum; Kenneth Sterling, Grand Exalted Booleywag; and Anthony Gilmore, the Honorable Chairman of the Committee for the Investigation of Vanadium Thumb Tacks. We have also a Commander of the Secret Service who is known as Hi Ho (Agent XQ 793). So, will all upholders of the established and ancient traditions signify their support by submitting their names in membership to the High Cocolorum of the IAOPUMUMFSTFPUSA. Unlimited. The Purpose Must Be Defended! Signed and sealed at our headquarters.

Our publication issued semidaily (Babylonian Cuneiform edition on stone tablets furnished on special request) known as "The Polymorphanucleated Lenkocyte" may be had free on receipt of three (3) energy units to our publication office at Llanfairpwllgwyngyllgogerychwyrndrobwllllandysiliogogogoch, Wales. At the present time we have exactly 345 538 members who are increasing steadily due to the use of yeast. (Adv.) Membership fee supplied on request. —Donald G. Wollheim, F. J. A., High Cocolorum, Kenneth Sterling, D. T. G., Grand Exalted Booleywag, 801 West End Avenue, New York, N. Y.

Toasted!

Dear Editor:

1935 seems to be starting out well. If your success continues at its present rate, you will attain unchartered heights. However, there is still much room for improvement.

The January and February covers were very good. Brown is a good artist, there is no doubt about that; he did not work for Gernsback years ago for nothing, but *WESSO*, S. T. F., artist de luxe, is THE master of the art. Do not get wrought up because I am bringing him up again and do not think that I am raising him, for there is something in the stroke of his brush that Brown can never equal, no matter what inspiration he has. Can't you try just a little bit harder to get Wesso back again? Just ONE of his masterpieces would be enough; the new fans would be clamoring for him, and the old followers would just feel more satisfied about the magazine. If Wesso is once more on the staff, one great step toward the Goal will have been taken.

The January issue was an all-star one. Every author had had experience in the art of S. T. F., and each one used his experience to good effect. Special commendation goes to Frank K. Kelley for *Star Ship Invincible*. It was well done. (Many new things were cooked up.) The novelette was "swell" and the shorts all very good.

The February number also was an all-star issue. *The Ultimate Metal* was great; leave it to Schachner to think up new ideas. *The Discus Men of Ekta* was a fitting sequel to *The Warriors of Eternity*. Give us more from this pair, please. The novelette was exceptionally well done. Weinbaum certainly knows how to contrive a realistic tale. His stories have an atmosphere of verisimilitude. The shorts again were all very good.

Now for the *Skylark*: it is not very hard to criticize a story like that. Excellent plus just about covers all loose ends. I was disappointed in the end, however, for I expected a battle royal, but Smith had other ideas and Seaton waded through all opposition with ease. Duquesne should have had some little tricks up his sleeve. I wonder if Smith will possibly write another sequel. What do you say, professor?

Having enormous hopes of the MIGHTIEST MACHINE.—Raymond Paul Marcella, 5873 Woodcrest Avenue, Philadelphia, Pennsylvania.

The Armchair Scientists.

Dear Sir:

This is my first venture into the Brass Tacks column of your magazine. After reading the February issue, in which appeared a letter from F. G. Hehr, I can no longer restrain a few pointed words to Mr. Hehr and others of his 'armchair scientist' breed. They may be good fellows personally, and ad that, but I and many others, I am sure, who are reasonably well-informed on technical matters, resent their sarcastic references to the work of modern technical men.

Hehr, after a scathing denunciation of all scientific theory, condescends to display his own theories. These, believe me, certainly upset the technical applecart. If they were in clear English, perhaps we others could understand and criticize them, but he effectively disguises them behind this sort of thing. (I quote from his letter) "My explanation of the nature of electricity. A warping of the atoms, or rather, of the fields of atoms." I must confess it's too abstruse for I and Dr. Einstein.

He kindly plays into my hands by displaying ignorance of modern theory—the very stuff he dares to sling mud upon. For instance, he says that physicists explain electric current in a metal conductor as a stream of electrons moving at the speed of light. Hence, he continues, since electronic speeds in gaseous conductors (Coolidge tube) only attain speeds that are fractions of the velocity of light the physicists are insane, and let's make Mr. Hehr president of M. I. T.

Well, I am only a college student in the third year of an electrical engineering course, and so I can't claim to be much of an authority, but I have heard somewhere that the modern theory envisions an electron stream in a metal conductor (electric current) as moving very, very slowly—in the neighborhood of a few centimeters per second. The rate of *propagation* of this electric current is the velocity of light. If your electrons in the wire are considered to be billiard balls touching each other and you push the end ball of a long line the *push* will move through the line almost instantaneously, and the ball on the other end will move, too. Each ball, however, will move comparatively slowly. This corresponds to the electric current.

Naturally, technical men and their theories may err. After all, we are human. But the aforesaid men are hampered by being compelled to spend years in acquiring the knowledge of those who have gone before, and also by their good common sense. Be hampered, I mean they cannot jump from nothing to fantastic *unfounded theory*, as your armchair scientists are prone to do. They are compelled in order to get material results, to proceed by steps, building on what they already have. When some one offers a workable theory which seems to fit the facts better than the one before, you'll find them only too glad to accept it. But it must pass the tests of cold reason and experiment.

That's all I have to say, and if I've offended Mr. Hehr, I am perfectly willing to give satis-

faction by letter or otherwise. The point I wish to make is that while pseudo science is a good thing for relaxation and an occasional idea the pseudo scientists must not let their imagination carry themselves to the point of debasing poor old slow, paby *real* science, which, after all, gets there in the long run. Also and equally as important those of the easy chair gang who want to talk technically should first know their science.

Thanks for the space, and it won't happen again.—E. H. Scheftelman, 1207 49th Street, Brooklyn, New York.

Copies?

Dear Editor:

I would like to get in touch with some one having in their possession the following copies of the old Astounding Stories magazine: all of Volumes I, II, III, IV, V, VI, and Number 1 of Volume VII, Number 3 of Volume IX, all of Volume X, Numbers 1 and 2 of Volume XI. Any one having these numbers or any of them, I wish would get in touch with me as I would like very much to get them.

Thanking you in advance for printing this letter.—E. Gnaedig, R. 3, Box 154, Santa Rosa, California.

Did I Miss Something?

Dear Editor:

This letter should have been addressed originally to the waste basket as that is probably its destination, but because I rarely write letters to magazines, I am entertaining faint hopes for the publication of this puerile bit of nonsense. (Ah, the yearning for publicity!)

In passing I wish to second Donald F. Ward's sentiments which are so ably expressed with regard to *Lo*. He is undoubtedly one of nature's noblemen. (Upon hearing which Mr. Ward grows in stature two inches.) I should like to hear from Mr. Ward if he cares to take the initiative.

All foolishness aside I am all expectancy. Why? The announcement that you are to have the third great master of sci.-fi. with you. Who could that be but the one and only Abraham Merritt! Am I right or am I right?

Now as to the t-v for February: my friends and cohorts, if that plot was original I hereby do solemnly swear to eat the trees, leaves, and whatever dirt that may adhere to the roots, from which said issues was so nobly constructed. I have read the same plot with variations in two of P. Schuyler Miller's stories, namely *The Arbentus Horror* and *Tetrahedra Of Space*. In Miller's stories the living substance was silica, and in Schachner's story it was a new metal. By the way, Miller's two stories were infinitely superior to Schachner's perfect specimen of the hack writer's art. It was easily the worst story of the month.

I wish to add my voice to the millions (?) of readers who demand Astounding semi-monthly. If you don't sell at least five copies of Astounding here in our fair hamlet, four other people deserve a medal for expert lying.

In closing, I wish the gentleman named Allcott (I guess) who had a letter in the January issue would get in touch with me. I've a feeling we are kindred souls.—Joe Igoe, 1111 55th Street, Kenosha, Wisconsin.

More Figures.

Dear Editor.

My first letter and I am in somewhat of a quandary as to the proper address. However after getting all heated up over *The Irrelevant* arguments I simply had to write to relieve my feelings. Didn't pay much attention to the story when I first read it, but after reading Brass Tacks of the February issue I became mighty excited over the threat to the dear old law of the conservation of energy.

I have had only a nodding acquaintance with high school physics, but they say "fools rush in where angels fear to tread." I did my calculations in the C. g. s. system for the sake of simplicity, and also used simple numbers. Here are the figures for what they are worth.

1. mass=1 gram
   velocity of mass=10 cm. 1 sec.
   force acting on mass=10 dynes
   acceleration=10 cm. 1 sec. (squared)
   time=1 sec.
   average velocity=15 cm. 1 sec.
   work done by force of 10 dynes=150 ergs.

2. mass=1 grom
   velocity of mass=100 cm. 1 sec.
   force acting on mass=10 dynes
   acceleration=10 cm. 1 sec. (squared)
   time=1 sec.
   average velocity=105 cm. 1 sec.
   work done by force of 10 dynes=1050 ergs.

Now the whole proposition rests on the hypothesis that a definite amount of fuel, burning, will exert a constant pressure (or better cause a constant reaction) for a fixed time irrespective of the speed of the rocket. Now the molecule of the gaseous fuel and the rocket would have the same velocity irrespective of the rocket's velocity relative to any other object. Therefore to my infantile mind it appears as though the law of conservation of energy really doesn't work here.

Now about the plan for stealing electrical energy by means of the magnetic field about a planet and the large coils in the rocket. Is Lenz's law regarding magnetic induction to be repealed too? Or did I miss some essential part of the plan? I would think that the rocket, coils and all would have to travel relative to the planet and the amount of energy picked up by the coils would be exactly balanced (neglecting heat losses) by the amount expended in overcoming the repulsive force built up by the induced current.

Had intended to make some comments on the issue in hand, but there's no use of overstepping the bounds of hospitality on one's first visit. Hoping to see more regarding *The Irrelevant*.—William Tufts, Ashland, Kentucky.

P. S. I almost forgot to ask you, was *Shortscale Castle*, by Calvin Peregoy, supposed to be funny?

Colossal Uprising!

Dear Editor:

What a colossal rising up against the brain teaser put out by Karl van Campen. What a lot of calories have been wasted in the search for a flaw in his mathematics of his rocket flight. What a show of indignation, because he claimed to have got more work for his oxydation of hydrogen propellant, but alas to no avail for even if you leave out the all important question of gravity and agree that space, beyond the limits of the stratosphere is, at least, a near vacuum, there is an all important question of the efficiency of his drive.

Without actual figures to work upon it can be seen that if the efficiency of his machine was X, and he derived from a certain amount of propellent Y, a velocity of Z feet per second, that in order to traverse space he must of necessity, have a decreasing in his X quantity, and an increase in Y in order to obtain Z through out his course, and that if Z is to be increased at a Q rate of acceleration, that the changes in the above X and Y would increase quite rapidly after each second.

Why only because a rocket's efficiency at any altitude above sea level decreases with the

lessening of the density of the medium through which the rocket must pass.

For those who are real curious, look up the works of Goddard, in the Smithsonian works that he has done.

And as for the formula crazy, within his works will be found all the formulae you crave, and more, too, for they take a rather high brand of math to work them.

Yes men will some day use rockets, but who wants to bet against me when I claim that some form of electrical force will do the trick. (That happens to be one of my pet theories, perhaps I'll write a story about it some time, after I know it won't really work.)—John S. Nicholls, West Medway, Massachusetts.

P. S.—Keep up the good work, Karl, what we want is the application of modern math and physics.

Old Files!

Editor, ASTOUNDING STORIES:

Although I have very little time in which to write this note I shall try to cover all topics that are on my mind at present.

First, let me thank you for the welcome information contained in your letter. As long as Stanley Weinbaum continues to write in his present style, I can enjoy his works to the utmost.

The only change that I would have made in the February issue would have been to leave out *Short-wave Experiment* and use the seven pages for Brass Tacks. The story could have been published later. Even though this is a fiction magazine, I find that it takes a very good story to beat the interesting letters that most of our correspondents write.

Although I have been a reader of science-fiction for many a year, I just recently became seriously interested in collecting. For that reason, my collection is very small at present. I would like to obtain ASTOUNDING STORIES as follows: all of 1930, all except March and August of 1931, all of 1932, all of 1933 except October and November and the February and March issues of 1934. Any of you that have these issues and want to get rid of them please let me know how much you want for them.

I would like to hear from other amateur radio operators who read this type of literature.—Ammon Young, W5BDI, Houston, Texas.

And Yet Again!

Dear Sir:

You asked for it, so here goes. I liked Weinbaum's *Parasite Planet* better than his *Flight On Titan*. However, neither of these stories had that whimsical style that made "Tweel" so "human." S. G. W.'s incidental description is the thing that makes his stories click. No kidding, I had to look up from the printed page more often than I'd like to admit in order to prove to myself that I was still in my chair on earth. Make this author give us the very best he's got, and don't go and reject his stuff easily to find that it makes a hell of a big hit in some half baked "rival."

I suppose I ought to put in my two cents about *The Irrelevant*. I wonder who Van Campen is. An M. I. T. grad? That's not so much. Plenty of dummies are turned out by our engineering schools who can spout knowledge by the cubic foot but as far as reasoning is concerned they make good sophists. I refer to Van's last paragraph on page 156. If a ship mat in space is not accelerating and, of course, not acting against any retarding force, then no force is acting on the body nor is it itself exerting any force. Therefore no work is being done on it, neither is the body doing work. However, the body does contain kinetic energy, numerically equal to the work that was done on it to bring it to its present velocity. This proves that work is not the same thing as energy. Both are measured in the same units and both are numerically equal for any free body in open space. But they are not identical.

Now energy means how much work a body can do. Suppose a body possesses 10 ergs of energy with respect to the earth. That means that this body can move a one gram mass 10 centimeters against the gravitational pull of the earth. Suppose a body possesses 10 ergs of energy with respect to the star Antares. That means that this second body can move a one gram mass 10 centimeters against the gravitational pull of Antares. But, oh, how different these gravitational fields are in strength, whoever these bodies happen to be. This just goes to show that these "ergs" are different and have different sizes whenever we change their reference points. So suppose a body contains 10 earth ergs of energy. But suppose it also contains 100 Antares ergs. The absolute quantity of energy is the same. It just happens that the Antares erg is smaller than the earth erg (say). The energy is the same, but by changing our reference point we've changed the size of our units. The same thing applies to *The Irrelevant*. W equals F times S all right, but boyohoy, how that F changes, and if the body is at rest, proceeding at uniform velocity, or moving in a frictionless medium such as outer space, F may even be zero. So Mr. 'Karl van Campen,' I say "In Dein Hut!"

I'd appreciate it very much if you'd let me announce in Brass Tacks that the International Cosmos Science Club is going strong. We publish a fifteen to twenty page magazine, have a laboratory and a library. These are all available to members and are the source of our science-fiction fans. Our membership rolls are still open. We welcome requests for information about our club. All interested persons should communicate with the secretary, John B. Michel, 3214 Beverly Road, Brooklyn, New York.—William S. Sykora, Long Island City, New York.

How About This?

Dear Editor:

Hark Ye! Though this may never reach the Brass Tackers, congratulations!

Hubert Allcock's letter called "Fighting Mad" hit the spot. I congratulated him personally, and I congratulate you for lavering it in Brass Tacks.

Some people can never be satisfied. Give them the best, and they still kick.

Allcock asserts, that he will favor every unfair kicker with his own personal criticism, and believe me, I'll be right behind him.

I hope that all of the various and sundry kickers will wise up to the fact that they have something good, and let their future criticism be constructive.

I see that the majority of your Brass Tackers are from the North. Well, I am now on my first go round, and from now on, I'LL hold up the Georgia end.

The short story, *Mind Over Matter*, by Gallun, left me with that unfinished feeling, so to speak. It should have continued, say, as long as did *Lo!* and I'm sure I would have enjoyed it far more.

I am keeping up with, and enjoying the story, "A bit of Pro and Con with the Breaker Upper of the Law of Conservation of Energy." The boys are now getting down to fine points and *The Irrelevant* is sticking to his guns like a man. I've got a sneaking hunch that the author had all the answers before he started the thing.

If the Brass Tacks department keeps up its quality of facts and fun, I suggest that you cut out the stories, call the magazine Brass Tacks, and run it in, or as, competition for the other science magazines.

In closing, I must say that Brass Tacks is an edifying department in a dandy magazine.—Bob Stuart, 2015 Bernard Street, Savannah, Georgia.

I agree on Weinbaum.

Dear Editor

I wish to extend my personal thanks to you for securing Stanley G Weinbaum While his *Parasite Planet* is in a way similar to *Flight On Titan*, it is, as a whole, one very good tale Usually I can't say much for an author's second yarn with the same basic elements, but Weinbaum somehow puts a dash into his stories that overcomes even this detraction More by Stan, please!

Dr Smith has written enough *Skylark* stories This is evident in his latest, just concluded, he wrote an absorbing yarn, during the initial installments of which I believe he rose to his greatest heights, but along in the latter chapters he seemed to lose interest and the tale's keen point became slightly worn And yet, even at that, *The Skylark Of Valeron* is worth the time to reread

So some of your readers don't care for Chas. Fort? I can't see how that is possible. Lo! was, to me a well-placed rebuke at science for shunning those things which they don't understand—or don't want to! Though written oddly, I found it not at all hard to read and hereby place my request for another Fort tale of truth (?) say *Book of the Damned, New Lands*, or *Wild Talents* And hurry up with it!

Campbell's greatest tale is *The Mightiest Machine* He has mixed fiction, science, and characterization until a delicious brain dish results, John is good!

Discus Men Of Etka, the tale co authored by Carl Buchanan and Dr Arch Carr, brought back the days when only one sf magazine ruled the newsstands Even the Dold illustrations tended to give this impression —Alvin Earl Perry, Box 265, Rockdale, Texas

We don't agree with your list. But we have 55% of it.

Dear Editor:

If I have not the majority with me in my arguments against stories of space ships as being sensible and stupid at least I have real scientists with me, as against high school students who think that they know everything about science The enclosed clipping will back me up

The sentence enclosed by red crayon is alone enough to show up the fallacies of space travel I can enjoy reading some of them as pure fiction, but what annoys me is to read letters from people defending their belief that it is a coming thing I like werewolf stories, but I do not try to show that there is any logic to them I know they are sheer fantasies

As to publishing Astounding Stories twice a month, I say no Why give the science?-fiction lovers all the breaks? There are three magazines for them printed every month now, whereas we lovers of the fantastic have only one If you must have another magazine, reissue "Strange Tales." That was miles ahead of Astounding Stories, in my opinion Your stories are getting too dry and technical now There is no need for an author to waste pages on space trying to show how an obviously impossible thing could happen, such as the dizzy stories of time traveling

Dold is getting worse every issue, if that is possible His machines are so gigantic, that a person would have to be hundreds of feet tall in order to reach the levers and wheels on them

Your two worst authors are Edward Smith and John W Campbell Nat Schachner invariably has a gripping style of writing that holds your attention to the end Calvin Peregoy is terrible Only two real authors have been discovered in the past year, Eando Binder and C L Moore You claim to have the best authors Here is a list of best authors; check them and see how many write for Astounding Stories EANDO BINDER—MILES J BREUER—STANTON A COBLENTZ- PAUL ERNST—JOHN RUSSELL FEARN—FRANCIS FLAGG ABNER J GELULA—EDMOND HAMILTON—CLARE WINGER HARRIS—CARL JACOBI—DAVID H KELLER—HENRY J KOSTKOS—FRANK BELKNAP LONG—C L MOORE—H THOMPSON RICH—VICTOR ROUSSEAU—NATHAN SCHACHNER—CLARK ASHTON SMITH—LESLIE STONE—A HYATT VERRILL—DONALD WANDREI—HAL K WELLS—JACK WILLIAMSON.

You have some of these authors, but what per cent?

I am in agreement with the letter of Ed Camille, published in the February issue

Although this letter would suggest that I do not like the magazine, I continue to find many good stories in it I also like the subheadings under the titles on the index page More stories like *He Never Slept, From the Wells of the Brain, The Invading Blood Stream, The Demon of the Flower, The Purple Brain, The Machine That Knew Too Much, The Confession of Dr Du Kalb, Rebirth, The Man Who Never Lived, The Ultimate Metal, The Other, The Hermone, The Vapor Death, Men Of Ages, The Great Thirst The Stolen Element, A Scientist Divides, The Truth About The Psycho Tector, Dr Lumie, The Nerveless Man, The Thing in the Pond, He Never Slept* The best story yet was *Succubus* After seeing this list of swell stories I'm sorry I wrote at all.—Harold F Keating 34 Arnold Street, Quincy, Massachusetts

I didn't say "Comparisons Were Odious"

Dear Editor:

Now that February issue is really something worth writing about! So I take it upon myself to tell you what I think about it That not being very much, I hardly know what to say, and "comparisons being odious," I won't say that Astounding is premier But I will say that you have the superior artist And, my dear sir, you are entirely wrong when you say that sf artists are no better than the average pulp artist

Show me ANY pulp, and the majority of the "slick" artists that can compare with Dold in imaginative qualities, pulp technique and accuracy that is essential in drawing scientific equipment

Be that as it may. But again I wish to stress my sincere approval of the bi monthly plan And another thing: Do you not believe that editorial answers to published letters should be printed after the letter? Half of the enjoyment and good that comes from Brass Tacks or could come, you skip entirely. I know it takes room—but I would much rather read one editorial comment then ten letters without them Think it over

Your stories need no commenting There are still many faults in science-fiction that are yet to be overcome. Nevertheless, you are making great strides towards overcoming them In fact all the sf magazines are. You do not lead the field—probably never will But you do give us wonderful science-fiction, and that is what we want No true fan wants to see one particular magazine to crowd from the field the other two Rather he wants to see all three advance, and become truly great magazines And they're doing it—all three Off trail magazines are trying out the time-worn plots concerning future war, invasion, etc., but they can never accomplish what you and the others have Financially, to you, it may be a race to extinction . to the fans, vice versa No matter what you do, the fan will read all three

If Astounding goes bi-monthly, your profits increase, and we get more science-fiction So what? Only one answer—go bi monthly

If you do not feel safe in investing in a Quarterly edition, wait until you do But I certainly hope you won't wait long —Lewis F Torrance, First Class Member 165, Science Fiction League Winfield, Kansas

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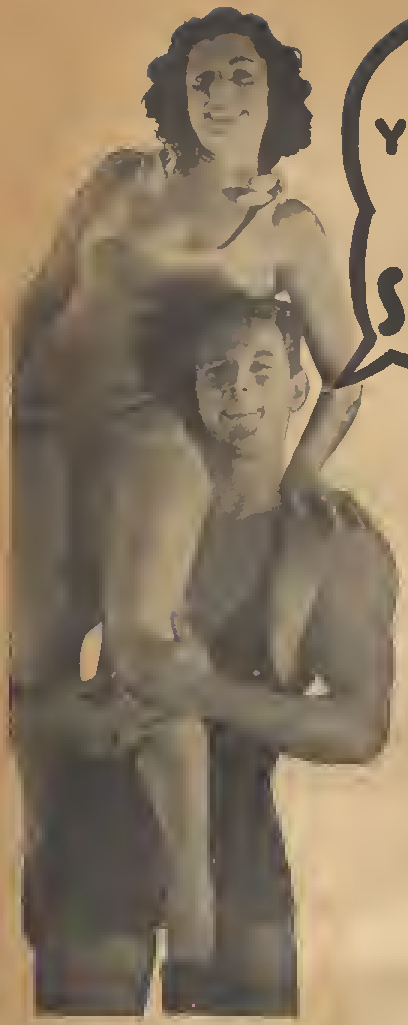

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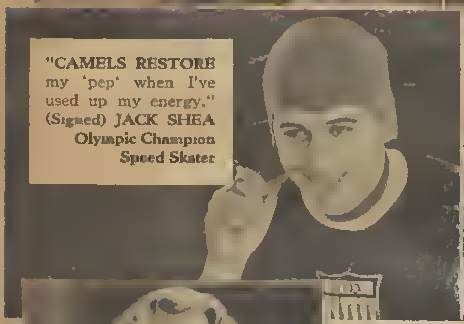
(Signed) RAYMOND F. STEVENS
North American Bob-Sled Champion



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(Signed) JACK SHEA
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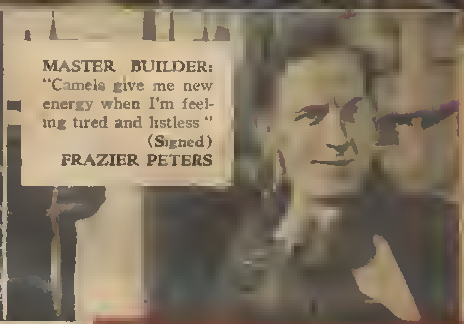
Speed Skater



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	8:00 p.m.	M S T
	7:00 p.m.	P S T
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	7:30 p.m.	M S T
	6:30 p.m.	P S T

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